Attachment C

Environmental Checklist

ENVIRONMENTAL CHECKLIST

I. BACKGROUND

1. **Project title:** *Basin Plan amendment to incorporate Pathogen TMDLs for Santa Ana River–Reach 3, Mill Creek–Prado Area, Cucamonga Creek–Reach 1, Chino Creek–Reach 1, Chino Creek–Reach 2, and Prado Park Lake in the Middle Santa Ana River Watershed*

2. **Lead agency name and address:** *California Regional Water Quality Control Board, Santa Ana Region, 3737 Main Street, Suite 500, Riverside, CA 92501-3348*

3. **Contact person and phone number:** *Hope Smythe (909) 782- 4493*

4. **Project location:** *Middle Santa Ana River Watershed, San Bernardino and Riverside Counties*

5. **Project sponsor's name and address:** *California Regional Water Quality Control Board, Santa Ana Region, 3737 Main Street, Suite 500, Riverside, CA 92501-3348*

6. **General plan designation:** *Not applicable*

7. **Zoning:** *Not applicable*

8. **Description of project:** *Adoption of a Basin Plan amendment to incorporate Pathogen TMDLs for Santa Ana River–Reach 3, Mill Creek–Prado Area, Cucamonga Creek–Reach 1, Chino Creek–Reach 1, Chino Creek–Reach 2, and Prado Park Lake. The TMDLs establish wasteload allocations and load allocations for allowable pathogen inputs by all identified sources that discharge to Middle Santa Ana River waterbodies. The intent is to achieve numeric, water quality targets that will protect the beneficial uses of the waterbodies. The Basin Plan amendment includes an implementation plan that details the actions required by the Regional Board and other responsible parties for implementing the TMDLs.*

9. **Surrounding land uses and setting:** *Not applicable*

10. **Other public agencies whose approval is required:** *The Basin Plan amendment must be approved by the State Water Resources Control Board, the Office of Administrative Law, and the U.S. Environmental Protection Agency before it becomes effective.*

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality	☐ Land Use / Planning
☐ Mineral Resources	☐ Noise	☐ Population / Housing
☐ Public Services	☐ Recreation	☐ Transportation / Traffic
☐ Utilities / Service Systems	☐ Mandatory Findings of Significance	

II. DETERMINATION

On the basis of this initial evaluation:

X I find that the proposed project COULD NOT have a significant effect on the environment.

____ I find that the proposed project MAY have a significant effect on the environment. However, there are feasible alternatives and/or mitigation measures available that will substantially lessen any adverse impact. These alternatives are discussed in the attached written report.

____ I find that the proposed project MAY have a significant effect on the environment. There are no feasible alternatives and/or feasible mitigation measures available that would substantially lessen any significant adverse impact. See the attached written report for a discussion of this determination.

______________________________ Signature

______________________________ Date

Hope Smythe
Senior Environmental Specialist

III. ENVIRONMENTAL IMPACTS

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS - Would the project:				
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?				X
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?				X
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				X
III. AIR QUALITY - Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?				X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				X
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
d) Expose sensitive receptors to substantial pollutant concentrations?				X
e) Create objectionable odors affecting a substantial number of people?				X
IV. BIOLOGICAL RESOURCES - Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?			X	~~X~~
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				X
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X
V. CULTURAL RESOURCES - Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in ¤15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to ¤15064.5?				X
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Disturb any human remains, including those interred outside of formal cemeteries?				
VI. GEOLOGY AND SOILS - Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?				X
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X
VII. HAZARDS AND HAZARDOUS MATERIALS - Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				X
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X
VIII. HYDROLOGY AND WATER QUALITY - Would the project:				
a) Violate any water quality standards or waste discharge requirements?				X
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site?				X
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-site or off-site?				X
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X
f) Otherwise substantially degrade water quality?			X	~~X~~
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X
IX. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X
X. MINERAL RESOURCES - Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X
XI. NOISE - Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				X
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				X
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
residing or working in the project area to excessive noise levels?				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X
XII. POPULATION AND HOUSING - Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: Fire protection? Police protection? Schools? Parks? Other public facilities?				X
XIV. RECREATION - Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?				X
XV. TRANSPORTATION/TRAFFIC - Would the project:				
a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?				X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?				X
f) Result in inadequate parking capacity?				X
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X
XVI. UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X
XVII. MANDATORY FINDINGS OF SIGNIFICANCE -				

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			X	~~X~~
b) Does the project have impacts that are individually limited, but cumulatively considerable? ('Cumulatively considerable' means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X	~~X~~
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?				X

Attachment - Environmental Checklist

Discussion of Environmental Impacts

Explanation of Environmental Checklist "Less than significant" Answers

Note: Adoption of the Basin Plan amendment to incorporate Bacterial Indicator TMDLs for Middle Santa Ana River Watershed waterbodies will not have any direct impact on the environment. Implementation of actions necessary to achieve the TMDLs may affect the environment, as described below. However, the intent of TMDL implementation is to restore and protect the water quality of the waterbodies and their beneficial uses. Any potential adverse environmental effects associated with TMDL implementation will be subject to project-specific CEQA analysis and certification to assure appropriate avoidance/minimization and mitigation.

IV. Biological Resources (b)

VIII. Hydrology and Water Quality (f)

XVII. Mandatory Findings of Significance (a), (b)

The proposed TMDLs call for reductions in bacterial indicator contributions to the waterbodies. Adoption of the TMDL Basin Plan amendment will not result in any direct environmental impacts. However, it also includes the explicit recognition that implementation of actions necessary to implement the TMDLs may effect the environment. Nevertheless, any such potential adverse environmental effects will be subject to project–specific CEQA analysis and certification to assure appropriate avoidance/minimization and mitigation of such impacts.

XVI. Utilities and Service Systems (b), (c)

The proposed TMDLs call for reductions in bacterial indicator contributions to the waterbodies from storm drainage systems. To achieve these reductions, modifications to storm drainage systems may be necessary. Connection of existing storm drainage systems to sewer systems may require collection and/or wastewater treatment plant modifications/expansions, with attendant construction-related environmental effects. In addition, wastewater treatment plant modifications may be needed to meet the bacterial indicator wasteload allocations. Any such projects associated with sewer or storm drainage systems modifications would be subject to further, case-specific environmental review and certification.

Attachment D

Comment Letters

From: <Kozelka.Peter@epamail.epa.gov>
To: William Rice <wrice@waterboards.ca.gov>
Date: 3/3/05 10:39AM
Subject: Re: Comments on MSAR Bacterial Indicator TMDLs and Basin Plan Amendment

I've given this more review and here are some comments:

-- move section 2.5 to 4; present and discuss applicable WQS in the numeric targets section (not by reference)

-- I recognize that you have e. coli in the IP monitoring but I strongly recommend you include these as alternative targets in section 4, afterall they will soon become State WQOs and you should present what the e.coli/entero levels are to give people an idea of what targets may appear on the horizon.

-- MOS of zero??? general principles of bacterial re-growth suggest that some MOS is worthy, even if you don't know specifically what is happening in the watershed. Unless you have data that shows re-growth is NOT ocurring then we must assume that it is therefore....

-- TMDL should set lower than std. not at the std.

where are you all with peer review?

I suggest we talk. I am available later today after 3pm or Friday after 1 pm.

--Peter Kozelka

WARREN D. WILLIAMS
General Manager-Chief Engineer

1995 MARKET STREET
RIVERSIDE, CA 92501
951.955.1200
951.788.9965 FAX

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

March 10, 2005

Mr. Gerard J. Thibeault
Executive Officer
California Regional Water Quality
Control Board - Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Dear Mr. Thibeault:

Re: Preliminary Comments on Draft Middle Santa Ana River Bacterial Indicator TMDL and Basin Plan Amendment

The Riverside County Flood Control and Water Conservation District (District) is the Principal Permittee on the Riverside County Municipal Separate Storm Sewer System (MS4) Permit. The District has also been participating in the TMDL workgroup since June 2001 and in the Santa Ana Stormwater Water Quality Standards Task Force (Task Force) since its inception. The District is submitting the following preliminary comments on the Draft Middle Santa Ana River Bacterial Indicator TMDL, Basin Plan Amendment (BPA), and Supplemental Staff Report dated February 3, 2005.

This TMDL has significant ramifications to stakeholders and the District is still analyzing the accuracy and potential impacts of this Staff Report. Therefore, the District can only provide preliminary comments at this time and requests that a second public workshop be scheduled to allow for more thoughtful and considered comments to be presented to the Regional Board by the District and other interested stakeholders.

In general, the Staff Report presents insufficient information to meaningfully establish a bacterial indicator TMDL. Concerns regarding the Staff Report include:

- It is acknowledged that the indicator bacteria (fecal coliform) identified in the draft TMDL is inappropriate. Control of the fecal coliform indicator may not result in protection of the REC-1 beneficial use;

- A cost/benefit evaluation has not been provided by staff to assist the Regional Board in considering the potential impacts of this significant public policy decision. Further, the costs that are provided are incomplete and, as described, misleading;

- Data is limited (and reflects an inappropriate bacterial indicator) and not all available data are considered;

- The identification of potential sources of bacterial contamination is misleading and incomplete. There is not enough data to make conclusions regarding sources in the TMDL technical report and data regarding background levels is not applicable in the Middle Santa Ana River Watershed. The misleading and incomplete information will hinder the ability of stakeholders to form a group and share costs, as well as create bias for future TMDL modification;

- The TMDL, as proposed, is economically and technologically infeasible, especially with regard to wet weather conditions;

- Contrary to the conclusion of the Staff Report, the proposed TMDL will result in significant environmental impacts and an Environmental Impact Report must be prepared to identify and address these impacts.

Of particular concern is the approach proposed to address the elevated levels of indicator bacteria. Section 2.5 (p. 45) of the Staff Report states:

> However, densities of bacterial indicators above certain levels indicate that there may be other organisms present that are harmful to public health. Such pathogens include viruses, bacteria and protozoa.

The purpose of the bacterial indicators as originally developed was to instigate studies or surveys to identify sources of human waste contamination such as leaking septic systems or broken sanitary sewer lines. Absent such sources or other evidence of human waste contamination, the elevated levels of bacterial indicators are considered as "false positives" and no further action is needed. The Staff Report forgoes investigation of these potential sources of human waste contamination. Instead, the Staff Report proceeds with the assumption that the bacterial indicators constitute contamination and that runoff source controls, especially Urban Runoff controls, are required. This could lead to the dedication of significant public and private resources where no significant public health hazards exist.

The Staff Report should provide a clear description of the purpose and use of bacteria indicators in evaluating waters for public contact. This information is fundamental to the development of a meaningful TMDL and compliance program.

Fecal Coliform Bacteria is an Inappropriate Indicator

As noted in the Bacterial Indicator TMDL Staff Report (Staff Report), section 2.5, page 46, USEPA conducted studies to evaluate bacterial indicator organisms other than fecal coliform. The purpose of the research studies, summarized in the Ambient Water Quality Criteria for Bacteria (USEPA, 1986), was to examine the relationship between swimming-associated illness and the microbiological quality of the waters used by recreational bathers. The results of these studies demonstrated that fecal coliforms possess little or no correlation to swimming-associated gastroenteritis. Two indicator organisms, *E. Coli* and enterococci, showed a strong correlation with the incidence of waterborne infectious disease in fresh waters.[1] In fact, the U.S. Center for Disease Control and Prevention has documented cases of gastroenteritis due to water contact in recreational waters whose bacterial levels did not exceed the recommended EPA guidelines for total and fecal coliforms.[2] The Staff Report further indicates that "consideration of revised bacterial quality objectives applicable to inland surface waters in the Santa Ana Region is in progress, but no formal action to adopt revised objectives based on USEPA's national criteria has yet been proposed."

Water Quality Objectives for inland surface waters for REC-1 and REC-2 in the Santa Ana Region Basin Plan are based on fecal coliform densities. However, it appears that the Storm Water Quality Task Force (SWQTF) is proposing to present revised Water Quality Standards, including Water Quality Objectives for REC-1 for the Regional Board's consideration within the next one to two years. To conform to the schedule for adoption of the bacterial indicator TMDL, the District recommends:

1. Adoption of an interim implementation plan for the TMDL that focuses stakeholder efforts on supporting SWQTF efforts and continued watershed monitoring in order to answer the following questions:

    a. What are the sources of bacteria in Reach 3 of the Santa Ana River; and
    b. What are the impacts of bacterial indicator transport, re-growth and decay in Reach 3 of the Santa Ana River.

2. Incorporation of an explicit "reopener clause" requiring the bacterial indicator TMDL to be updated to be consistent with the findings of the SWQTF and any conclusions from additional data collected by the TMDL stakeholders upon approval of the findings by the Regional Board. Once the TMDL has been updated to be consistent with the agreed upon findings of the SWQTF studies, additional implementation plan requirements including modification of stakeholder compliance documents and compliance monitoring (Tasks 3, 4 and 5) can be pursued.

A Cost/Benefit Study of the Proposed TMDL Must Be Provided

The Staff Report, section 11, page 88, first paragraph identifies three statutory triggers for consideration of economics in basin planning:

1. Adoption of an agricultural water quality control program (Water Code Section 13141);
2. Adoption of a treatment requirement or performance standard; and
3. Adoption of water quality objectives (Water Code Section 13241)

The Staff report incorrectly concludes that the three statutory triggers mentioned above do not contain a statutory requirement for a formal cost-benefit analysis.

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[1] USEPA Protocol for Developing Pathogen TMDLs, January 2001, page 2-1
[2] Morbidity and Mortality Weekly Report. CDC. November 22, 2002, Vol. 51, No. SS-8, page 15.

Section 11 also states:

> "...similarly, implementation of this TMDL will likely necessitate changes in programs (including educational programs and BMPs) designed to reduce bacterial inputs from urban stormwater or other sources. It is necessary, therefore, to consider the costs and potential funding mechanisms for the implementation of new/modified agricultural water quality control program, and the costs of other measures that may be necessary to achieve (and monitor) compliance with the TMDL."

The costs to achieve the proposed TMDL targets and the relative value of the expected improvements in the attainment of beneficial uses must be fully identified and considered in the issuance of the TMDLs. Sections 13000 and 13241 of the California Water Code specifically states that economic considerations must be considered by the Regional Board. The Superior Court of California has ruled that in amending a basin plan to include a TMDL, the same considerations must be made in the proposed TMDL as was in the adoption of the original basin plan:

> "Under the applicable statutory scheme Basin Plans (1) identify beneficial uses of water bodies to be protected; (2) establish water quality objectives to protect those uses; and (3) establish implementation programs for achieving the objectives.
>
> As such, Respondents are incorrect in stating no water quality objectives are implemented. It may be true the Basin Plan was only amended to add the TMDL, but if the TMDL was originally part of the Basin Plan it necessarily would have made economic considerations under Section 13241. It is certainly reasonable to conclude that when amending the Basin Plan the same considerations should be made."[3]

Consideration of economics, as required by statute, implies quantification of estimated costs for the purpose of evaluating the costs compared to the anticipated benefit from a particular course of action or project. Further, Section 13000 requires that Water Quality Regulations be reasonable, considering the total values involved, including economic and social values. Irrespective of any mandatory requirements to do so, the citizens of California justifiably expect their public decision-makers to fully assess the costs of proposed programs and requirements and to assess whether the anticipated benefits justify these costs, including cost/benefit analysis. The Staff Report must provide a meaningful and thorough cost/benefit analysis so that the Board can responsibly make informed decisions regarding the proposed TMDL.

As described below, the potential costs of compliance with the proposed TMDL are enormous, especially during wet weather conditions. The benefits of attainment of the TMDL during wet and dry weather conditions must be identified and their value compared with the compliance costs.

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[3] Statement of Decision. The City of Arcadia, et al versus The State Water Resources Control Board and the California Regional Water Quality Control Board, Los Angeles Region. Filed December 24, 2003. Page 13, lines 11-18.

Recognizing staff limitations and the significant economic impacts of this proposed public policy, it should be noted that the SWQTF is attempting to assess the costs and benefits of compliance with current REC-1 water quality objectives within the Middle Santa Ana River Watershed. The Permittees are assisting with this assessment that will be incorporated into the SWQTF findings. In the interim, the Permittees have prepared and included preliminary cost estimates for compliance with current REC-1 standards based on actual implementation costs and studies done elsewhere in California. These preliminary cost estimates should be incorporated into the TMDL technical document. It is clear even from this preliminary analysis that the TMDL, as proposed, is both technologically and economically infeasible, especially under wet weather conditions. For this reason, it is imperative that the TMDL either be delayed until the SWQTF has completed its efforts or that the implementation plan focus preliminary compliance efforts on supporting the SWQTF efforts.

Limited Monitoring Data and Source Identification

Section 5.5 of the Staff Report incorrectly, or at least prematurely, concludes that POTW discharges to the Santa Ana River and tributaries are not sources of fecal coliform. Section 5.3 of the Staff Report and conclusion 6 of Section 5.5 acknowledge that bacterial transport and bacterial growth/decay processes and their impact on bacterial indicator levels in the Santa Ana River are not understood. Also, the impacts of other activities in the River between outfall locations on bacterial indicator levels are unknown. Examples of sources that may impact bacterial indicator levels include wildlife and transient encampments along the Middle Santa Ana River.

As we have discussed with Regional Board staff, the Permittees plan to fund an expansion of the UCI bacteria study to begin to address the bacterial growth/decay issue in the Middle Santa Ana River. In addition, the Permittees are proposing that the implementation plan be modified to include an analysis, possibly including field reconnaissance surveys, to further identify sources, processes and activities in the vicinity of the Santa Ana River in Riverside County that may affect bacterial indicator transport and growth/decay processes.

Data presented within the Staff Report do not appear to include the full body of available bacterial data within the limits of Reach 3 of the Santa Ana River. In compliance with the Riverside County MS4 Permit, the District has been performing dry and wet weather monitoring of bacterial levels within Reach 3 of the Santa Ana River and at other area outfalls for several years. The use of monitoring and flow data would greatly supplement data that the Board and the USGS are using to develop the TMDL and its model. The District's bacteria data is being transmitted electronically to Regional Board staff as part of this comment letter. Also, the data should already be available at Regional Board offices through the annual reports prepared by District staff in compliance with our MS4 Permit. The District requests that Regional Board staff determine if other bacteria data is available for use in characterizing the sources and extent of fecal bacteria pollution.

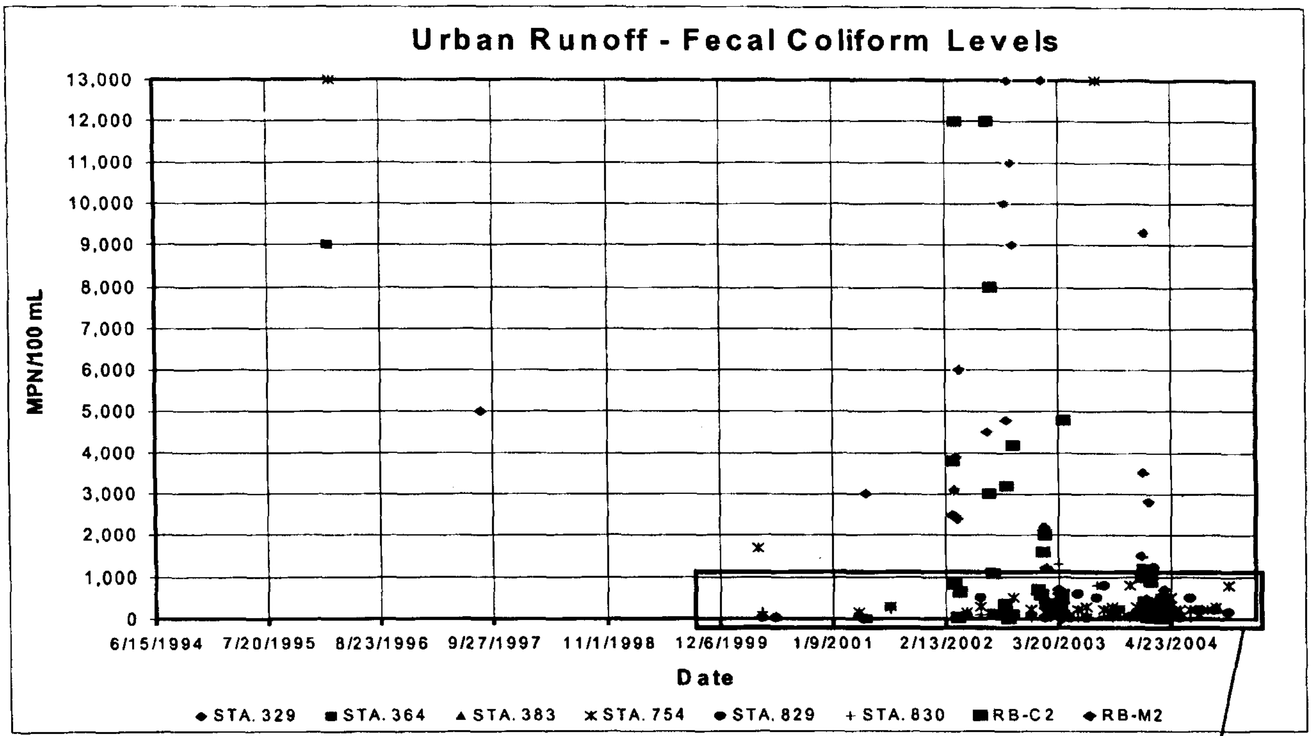
Results of the District's wet weather monitoring data from November 2004 along the Santa Ana River upstream of Reach 3 show fecal coliform levels below 200 MPN/100 mL indicating that Urban

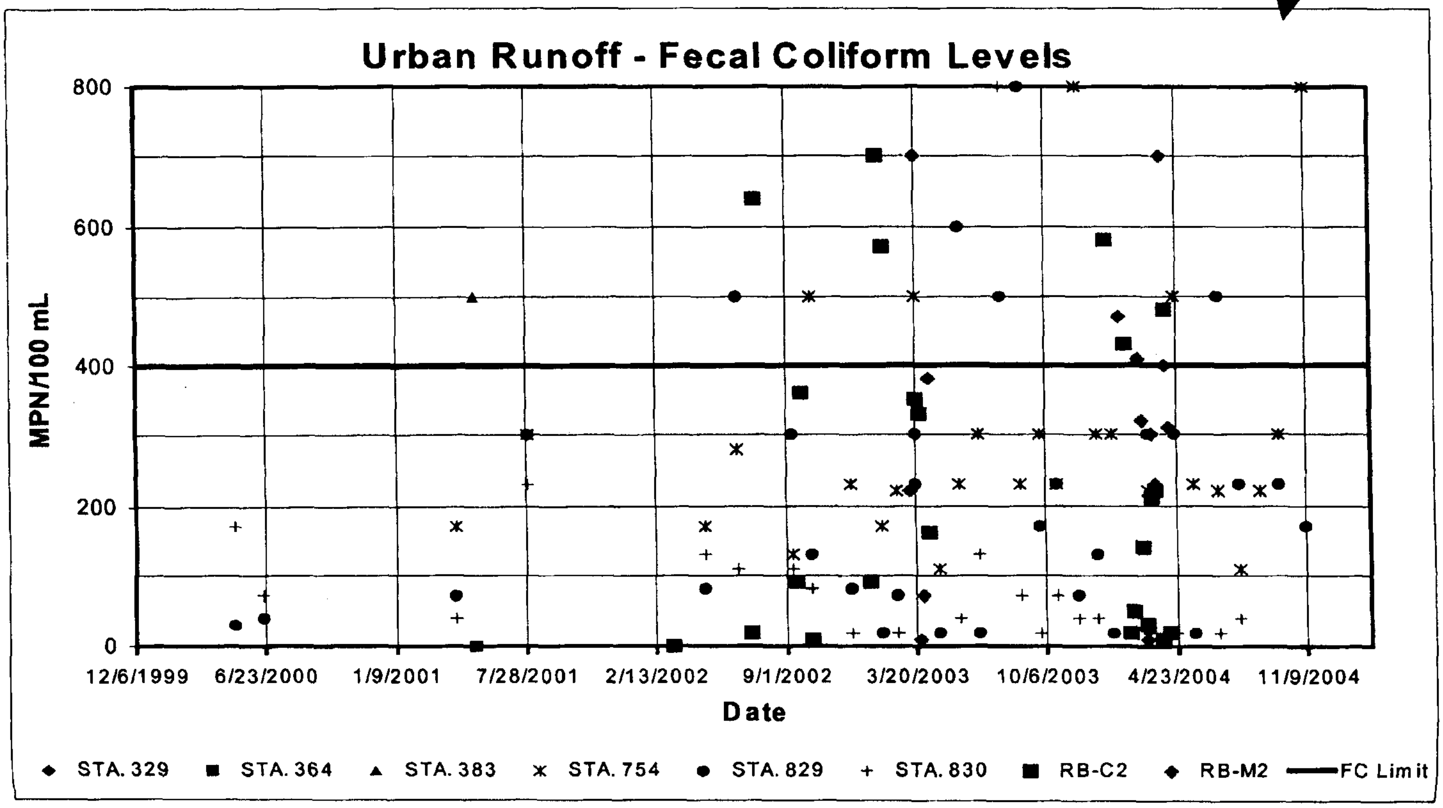
Runoff[4] in Riverside County should not be designated as a significant contributor of fecal coliform bacteria. Figure 1 (attached map) shows District sampling locations.

The following figures depict fecal coliform levels from sampling locations at or tributary to the Middle Santa Ana River in Riverside County. Note that 78% of the entire data set are below the 400 MPN/100mL single sample limit proposed by the TMDL. The Regional Board's urban sites, C2 and M2, are also plotted on these graphs. The sampling stations represented in the graphs are listed in the following table:

Station	Location
329	Anza Channel @ Arlington and Monroe
364	Santa Ana River @ Magnolia Center SD Outlet
383	Sunnyslope – Lower Channel @ Rio Road
754	Santa Ana River @ River Road
829	Santa Ana River @ Market
830	Santa Ana River @ Pueblo

[4] As defined in the Riverside County MS4 Permit.


Urban Runoff - Fecal Coliform Levels
MPN/100 mL
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
6/15/1994
7/20/1995
8/23/1996
9/27/1997
11/1/1998
12/6/1999
1/9/2001
2/13/2002
3/20/2003
4/23/2004
Date
STA. 329
STA. 364
STA. 383
STA. 754
STA. 829
STA. 830
RB-C2
RB-M2


Urban Runoff - Fecal Coliform Levels
MPN/100 mL
800
600
400
200
0
12/6/1999
6/23/2000
1/9/2001
7/28/2001
2/13/2002
9/1/2002
3/20/2003
10/6/2003
4/23/2004
11/9/2004
Date
STA. 329
STA. 364
STA. 383
STA. 754
STA. 829
STA. 830
RB-C2
RB-M2
FC Limit

Urban Runoff as a Significant Source

Page 11 of the Staff Report indicates that the dry weather sources of flow in the Santa Ana River are nuisance urban runoff, rising groundwater, and discharges from Publicly Owned Treatment Works (POTW). The District requests that the relative contribution of these sources be quantified for the purposes of the TMDL. In addition, we request that the Staff Report identify the relative contribution of each of these sources in Riverside, Los Angeles, and San Bernardino Counties.

In Section 5.5, the Staff Report concludes that Urban Runoff is a significant source of bacterial indicators year-round. However, this conclusion is not supported by the data collected in Riverside County. In May 2002, the District conducted a survey of the Santa Ana River in Riverside County and found that virtually no Urban Runoff is discharged to the Santa Ana River during dry weather. This study is attached. During dry periods, the Santa Ana River flows in Riverside County consist almost entirely of POTW discharges, produced water from the Arlington Desalter and rising groundwater. As described previously, bacterial indicator levels in Urban Runoff in Riverside County are low, further supporting that this is not a significant source. Although Urban Runoff is not a significant component of the dry weather flow or bacterial indicator levels in Riverside County, the District recognizes that this may not be the case in San Bernardino or Los Angeles Counties. However, the relative proportion of flows from various sources in the Santa Ana River should be incorporated into the analysis of sources and their significance, by stakeholder. This information will be fundamental to the development of future waste load and load allocations as well as cost sharing formulae for stakeholders.

The sources of bacterial indicators in Urban Runoff primarily reflect a variety of sources not associated with human waste, such as wildlife, soil bacteria and vegetative decay. However, POTW effluent, by definition, is a direct discharge of bacterial indicators associated with human waste. Although these levels are reduced by disinfection, re-growth of these bacterial indicators and any associated pathogens are of greater public health concern. Therefore the POTW dischargers should fully participate in the bacterial indicator TMDL.

Natural/Open Space Land Use as a Significant Source

Section 5.5 of the Staff Report incorrectly concludes that open space and wilderness areas are not significant sources of fecal coliform under dry weather conditions. Section 5.2.1 indicates that open space water quality samples were collected only during dry weather. The lack of significant bacterial indicator densities during dry weather, when overland flows would be essentially nonexistent, does not indicate that Natural/Open Space land uses are not a significant source. Should wet-weather monitoring indicate elevated bacterial indicator densities, the stakeholders responsible for Natural/Open Space land uses (not the MS4 Permittees) should determine the sources and propose management plans as appropriate.

Section 5.2.1 also notes that the open space water quality samples were collected in the mountains outside of the study area. As noted in the text, the flows sampled represent snowmelt, rising groundwater and springs – flows that are not impacted by non-anthropogenic sources of background contamination including wildlife and decaying organic matter that would be expected to affect the levels of bacterial indicators found in the Santa Ana River. Further, these source waters are much cooler than tributary source flows in the study area or the Santa Ana River, which would result in much lower bacterial levels. To be truly representative, background open space runoff samples should be collected in the Middle Santa Ana River Watershed as close as possible to the areas where river samples are collected.

Further, recent studies have indicated that wild and/or domesticated animals, including migratory birds, may be a significant source of bacterial indicators. The Santa Ana River open space areas are home to many animal species and are considered an important stopover point for many species of migratory birds. It is entirely possible that animals that live in, or traverse through, the Santa Ana River contribute significant portions of dry weather bacterial indicator levels in the River.

Specific Cost Estimates Need Further Evaluation

The Staff Report, Section 11.2, pages 89-90 identifies the following control measures and presents estimated costs for implementation:

- Identification and evaluation of BMPs to address pathogen-generating activities;
- Subsurface wetlands;
- Runoff diversion and treatment;
- Street sweeping; and
- Public education (e.g., Youth Conservation Corps cleanup programs).

The effectiveness of the identified control measures in addressing bacterial levels is highly questionable. Wetlands have shown mixed results in reducing bacterial indicators from runoff, and in some cases, have increased bacterial indicator loading due to inputs from birds and other wildlife. These mixed results are presented in the Staff Report monitoring data from Chino Creek, upstream and downstream of the wetlands. On several instances, the data shows significant increases in fecal and total coliform densities through the wetlands due to inputs from birds and other wildlife.

The District is not aware of any studies that have shown street sweeping as an effective bacterial control measure. At most, street sweeping eliminates sediment, trash, and other larger pollutants from entering into the MS4. Similarly, the District is not aware of any studies that have demonstrated that creek clean up programs (e.g., Youth Conservation Corps) are effective in controlling bacterial growth, nor would such activities be expected to control bacterial indicator levels. A determination of the projected effectiveness of the proposed control measures in meeting the bacterial indicator objective must also be provided. Although runoff diversion and treatment are implemented in limited applications within Orange County, these diversions are limited to dry weather flows and are directly associated with discharges to recreational beaches. In no area of the Santa Ana Region are large watershed areas diverted to the sanitary sewer system.

Short of disinfection, we are not aware of any stormwater treatment BMPs that have achieved high levels of effectiveness in removing coliform bacteria. In order to effectively treat/reduce the amount of fecal coliform in Urban Runoff, an active treatment system would need to be employed. An active treatment system employs the use of disinfection by chlorine, ozone or ultraviolet (UV) light or by diversion to a regional stormwater treatment facility. Further, given the conditions in the Santa Ana River (warm temperatures and presence of organic material), regrowth would be expected even if treatment were provided.

In the Middle Santa Ana River Watershed, wet weather flow contained significantly higher counts of fecal coliform than dry weather flows. Treatment of wet weather flows is not feasible due to economic and technological limitations of current technologies.

The City of Huntington Beach had investigated treating dry weather flows using UV light disinfection. The City estimated a capital cost of $131,300 for this system. To transfer this facility to the Reach 3 of the Santa Ana River would require that flood waters be dammed and released at the treatment capacity of the facility (200 gpm)[5]. Peak wet weather flow at the MWD Crossing of the Santa Ana River was 31,300 cfs (total storm volume was 214,400 ac-ft) in February 1998. Although this is not the wettest year on record, it is an example of a typical wet weather event. It would take the construction of at least two dams with equivalent storage capacity as Seven Oaks Dam (145,000 AF) and approximately 740 years of detention to treat this flow with UV light disinfection in a facility of comparable size to that proposed by the City of Huntington Beach (capacity 200 gpm). Furthermore, the capital cost in building a string of facilities, total capacity to treat 31,300 cfs, along Reach 3 of the Santa River could cost $15 billion. It should be noted that the estimated 100-year flow rate of the Santa Ana River is 144,000 cfs, or approximately five times the peak flow rate of the 1998 event, indicating that wet weather treatment costs could exceed $60 billion. Although urban discharges within Riverside County are minimal during dry weather, the proposed TMDL could ultimately trigger a requirement to treat dry weather flows with UV disinfection. This could potentially be costly as Permittees may be required to treat via UV disinfection at their numerous outfalls to the Middle Santa Ana River and its tributaries.

Cost Estimates Misleading

The cost estimates provided in the Staff Report for the proposed implementation program are misleading. Cost estimates for monitoring program implementation are provided in Section 11.3, page 90 and cost estimates for source identification programs are provided in Section 11.4, page 91. These cost estimates are overly simplistic and need further development to substantiate the actual costs of implementation, monitoring, and source identification and to justify the costs relative to the reasonably anticipated benefit.

Similarly, the estimates provided for implementation of source control measures are grossly underestimated and misleading. The estimates provided in the Staff Report for subsurface wetlands and runoff diversion and treatment are for implementation of single facilities that would provide treatment for a tiny area of the watershed. To fully address all sources, scores – perhaps hundreds – of such facilities costing many millions of dollars may be required. An estimate of the number of

[5] "End of Pipe Feasibility Study." City of Huntington Beach. June 2002.

such devices required in the Middle Santa Ana River Watershed and the full cost of implementation of such devices throughout the 488 square mile area of the Middle Santa Ana River Watershed must be provided to fully assess the cost/benefit. For example, constructed wetlands involve major expenses including land/right-of-way acquisition, capital improvement expenditures, and long-term operations & maintenance. Diversion of non-storm flows involves not only the capital expense of the diversion facility, but also operation and maintenance of the facility and the cost of treatment. A full accounting of associated costs is required to accurately characterize the range of potential implementation expenses.

The TMDL Should Distinguish Between Storm and Dry Weather Conditions

The problem statement regarding elevated indicator bacteria levels presented in Section 3 is largely based on storm event data. However, due to the physical conditions in the Middle Santa Ana River and the major tributaries, attempting REC-1 activities described in Section 3.3 during storm conditions is extremely hazardous and can be fatal. This fact is illustrated all too often in dramatic news reports during significant storm events. During storm events, elevated levels of indicator bacteria are of little real concern and due to the enormous volumes of water involved, are not amenable to any source or treatment control measures. Therefore, although indicator bacteria objectives may be exceeded in storm flows, there is no beneficial use to be protected to warrant imposition of a TMDL. Therefore, the District requests that the TMDL during these conditions only apply to non-storm periods.

Section 5 of the TMDL technical report presents water quality data from samples collected during storm and non-storm events. Two of the stations are located in Riverside County (Santa Ana River @ MWD Xing and Santa Ana River @ Hamner Ave.). It is noteworthy that the monitoring data for the Hamner Avenue station does not support the Listing Policy Criteria. Although the Staff Report identifies that the MWD Xing station did meet or exceed the State Water Resources Control Board 303(d) Listing Policy Criteria, two of the three exceedances occurred during the summer. As described in the Staff Report this is the period during which REC-1 activities are most likely to occur. However, it is also the period during which there is essentially no discharge of Urban Runoff to the Santa Ana River from the Riverside MS4. Due to the significant differences in wet and dry weather conditions and potential source contributions to indicator bacteria levels, the TMDL should separately address these climatic conditions.

Environmental Checklist

The District disagrees with the conclusion in the Staff Report that the proposed TMDL will not have a significant effect on the environment. Specifically, the District finds that adoption of the proposed TMDL may result in impacts on the following categories identified in the CEQA Checklist:

I.c. Existing runoff control requirements are contributing to the exodus of the dairy industry from the Chino Basin. The imposition of additional control requirements as proposed in the Staff Report may add to this condition.

IV.b. Compliance with the proposed TMDL may result in infiltration, diversion of low flows from natural drainages to the sanitary sewer system and other actions to eliminate or significantly reduce non-storm flows. This may result in an adverse impact on riparian habitat and federally protected wetlands reliant on these flows.

VIII.f. Compliance with the proposed TMDL may substantially degrade water quality by diversion or reduction of flows.

XVI.b Diversion of low flows to the sanitary sewer system as proposed in the Staff Report may result in the need to construct new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

XVI.c Requirements to treat Urban Runoff to comply with the TMDL may require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

XVII.a. Compliance with the proposed TMDL through the reduction, elimination or diversion of low flows of Urban Runoff has the potential to degrade the quality of the environment, substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal.

XVII.b. Compliance with the proposed TMDL through the reduction, elimination or diversion of Urban Runoff throughout the 488 square miles of the Middle Santa Ana River Watershed may result in impacts that are individually limited, but cumulatively considerable.

XVII.c. Compliance with the proposed TMDL through the reduction, elimination, diversion or treatment of Urban Runoff may result in environmental effects that may cause substantial effects on human beings, either directly or indirectly.

Specific Comments

Figure 1 (attached map) shows the area of the Middle Santa Ana River Watershed. The District sampling locations of the Santa Ana River and each of the major watercourses in the watershed should be added. In addition, the Riverside/San Bernardino County Line should be added as the discharges from each MS4 is separately permitted.

Section 2 – Except as a result of significant storm conditions, the runoff in the Middle Santa Ana River Watershed does not affect coastal beaches. The discussion of the hydrology of the Santa Ana River should identify the annual average number of days of contiguous flow from Prado Dam to the Pacific Ocean. In addition, it should be noted that even during these conditions, runoff is detained behind Prado Dam for a considerable period prior to discharge. Most flow from Prado Dam is captured by the Orange County Water District to recharge the Orange County groundwater basin and this process removes bacteria.

Section 2.4.1 - The title and discussion of Section 2.4.1 are misleading. The water discharged from the POTWs is not "recycled" as this suggests an intentional reuse. Although treated to meet discharge requirements, the discharge is effluent and should be described as such in the title and discussion. In addition, the discussion should note that growth and regrowth of indicator bacteria may occur downstream of these discharges, and this is currently being investigated.

Section 2.4.3 - As described previously, discharges of Urban Runoff from the Riverside County MS4 during dry weather are almost non-existent and monitoring has shown low levels of indicator bacteria. Addition of this information to the description of Urban Runoff in Section 2.4.3 is requested.

Section 2.4 - Produced water from the Arlington Desalter (estimated to be 10 cfs) is a significant component of the flow in the Santa Ana River. In addition, water deliveries from intra-basin transfers and imported water, as well as dewatering discharges permitted by the Regional Board also add to the overall flow. A discussion of these sources and their impact on bacterial indicator levels should be included in Section 2.4.

Table 14 - Table 14 of the Staff Report proposes a limit of "400 organisms/10 mL for any 30-day period" in not more than 10% of samples. This appears to be a typographical error. The standard unit for bacterial density is usually stated in terms of organisms per 100 mL.

Table 14 of the Staff Report and Table 5-9x of the draft Basin Plan Amendment – These tables propose that 5 samples per 30-day period be collected to monitor fecal bacterial levels in the Middle Santa Ana River. Simple arithmetic calculates that 1 sample out of 5 is equal to 20%; thus, achieving 10% compliance among 5 samples would be impossible. The District recommends changing the percentage 10% to 20% in any 30-day 5-sample set. The text should read:

> 5-sample/30-days Logarithmic Mean less than 200 organisms/100 mL, and not more than 20% of the samples exceed 400 organisms/100 mL for and 30-day period.

Table 5-9y of the Draft Attachment to Resolution No. R8-2005-0001 provides agricultural dischargers six months to develop and implement a bacterial indicator source evaluation plan, while urban dischargers are provided only three months to develop their plans. The watershed-wide water quality monitoring plan also has a three-month compliance date. These dates are insufficient to organize affected parties, develop and review proposals to select consultants for study development, and budget funding to implement the studies. The District recommends at least 18 months after adoption of the basin plan amendment for all stakeholders to allow for coordination, budgeting and development of the requisite programs.

Section 11.3, page 90 – Monitoring cost estimates need to include staff time, including possible overtime, if samples are to be collected outside of normal working hours, equipment such as vehicles, data quality control and interpretation, and report preparation.

Section 11.3 notes that a Proposition 13 grant was awarded to SAWPA to work with the USGS in developing the Phase II TMDL Monitoring and Modeling Program. The Staff Report should identify how much funding was awarded, and if this grant will address Urban and Agricultural stakeholder bacterial source assessment tasks specified in the Implementation Plan.

Section 11.4 – This section should include details or references to the comparable Proposition 13 projects referenced. Supporting data should include the location and specific purposes of the grants, and details such as the size of the watershed analyzed, the type and extent of land uses present, and the number of monitoring stations used to support the analysis.

Attachment A, Task 3 - The District recommends the Regional Board modify this task consistent with our comments on Page 3 of this letter. In addition, the minimum specifications for the monitoring program should be eliminated to allow stakeholders to consider an alternative, and potentially more effective, Regional Monitoring Plan. This task should only specify the questions that need to be answered by the monitoring program (see page 3).

Summary

The information in the draft Staff Report is insufficient to support the adoption of a bacterial indicator TMDL for the Middle Santa Ana River, and it is unlikely that adequate information can be developed prior to the scheduled TMDL adoption date. Further, realistically feasible treatment controls on the scale needed to attain the TMDL during wet weather conditions do not exist and should be so recognized in the Staff Report. Therefore, we request that an interim TMDL limited to dry weather conditions be developed that focuses on the following:

- Amendment of the Basin Plan to implement more appropriate bacterial indicators;
- Development of needed additional information regarding sources and bacterial indicator transport and regrowth;
- Continued implementation of public education, pet waste management programs and other ongoing programs to control sources of bacteria indicators by the MS4 Permittees,

During the interim period, the Permittees will participate in assisting the Regional Board staff, the San Bernardino Permittees, agricultural interests, POTW dischargers, state and federal facility operators, and others in addressing these deficiencies in supporting the efforts of the SWQTF so that a meaningful TMDL can ultimately be developed. This assistance can include:

- Supporting the Task Force in identification of needed amendments to the Basin Plan;
- Additional evaluation of existing bacterial indicator data;
- Continuing to support the UCI study to identify the transport and growth/regrowth of indicator bacteria;
- Identification and evaluation of bacterial source and treatment controls, including evaluation of effectiveness and implementation costs and potential environmental impacts;
- Continue working with the Regional Board and the operators of sanitary sewer systems to develop and promote implementation of sanitary sewer overflow cleanup procedures;
- Continue providing oversight over the design, construction and operation of individual septic systems; and
- Continue to work with operators of the sanitary sewer systems to require restaurants to implement fat, oil and grease equipment and programs to avoid sanitary sewer blockages resulting in overflows.

However, the Permittees are emphatic in their concern that the Staff Report not view municipal budgets as a "deep pocket" source of funding for surface water quality control programs. In allocating funding responsibilities for TMDL related activities, all potential dischargers, including the POTW operators and sanitary sewer operators, Los Angeles County MS4 Permittees, Phase II Permittees, State (Caltrans, Department of Corrections, University of California, State Colleges and Universities, etc.) and Federal (Department of Defense) agencies must be required to participate to the proportion of their relative contribution. Similarly, in addition to revision of the Waste Discharge Requirements (WDRs) for San Bernardino and Riverside County MS4s and the CAFO facilities, the WDRs for the Los Angeles County MS4 Permittees, Caltrans, all Phase II Permittees in the Middle Santa Ana River Watershed, sanitary sewer system operators and others should be revised to address compliance with the proposed TMDL.

Bacteria associated with soil and wildlife contribute to the exceedance of bacterial indicator objectives in the Santa Ana River. There is anecdotal evidence of transient encampments along the Santa Ana River (not an element of the Permittee's MS4) that may contribute to exceedances of bacterial indicator objectives in the Santa Ana River. These sources are not specific to the MS4 Permittees or other local dischargers. Therefore, the associated monitoring and treatment and source control costs should be allocated to the State and identified in the Regional Board's annual budget requests.

The District is committed to cooperating with the Regional Board and other stakeholders in developing and implementing programs to manage Urban Runoff. The District also has a duty to the citizens of Riverside County to practice responsible government and utilize taxpayer monies on projects and programs that guarantee benefits commensurate with their costs.

The District appreciates the opportunity to comment and work proactively with Board staff in the development of this TMDL. If you have any questions, please contact Jason Uhley of our Regulatory Division at 951.955.1273.

Very truly yours,

J Uhley for

STEPHEN E. STUMP
Chief of Regulatory Division

Attachments

c: Co-Permittees
San Bernardino County Flood Control
Attn: Matt Yeager
Los Angeles County
City of Pomona
City of Claremont

TMR:ABC:cw
PC/92705

Field Investigation
of the
Riverside County Flood Control & Water Conservation District
Storm Drain Outlets into the Santa Ana River

May 28, 2002

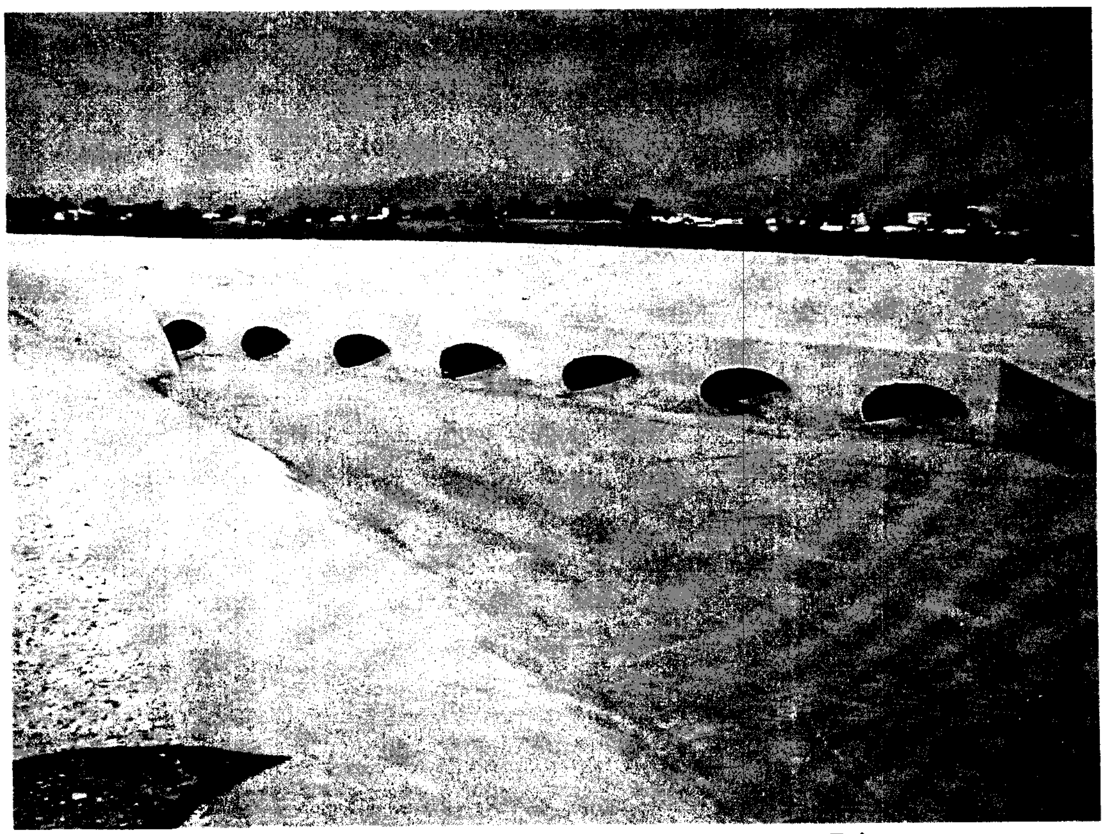
Prepared By:

Steven Clark and Tom Clem

The Hydrological Data Collection Section of the Riverside County Flood Control District performed a field investigation on 12 RCFC storm drain outlets into the Santa Ana River and Prado Basin from the San Bernardino County Line to the Orange County line. The field investigation was conducted on May 24 and 28, 2002. The purpose of this investigation was to determine the contribution of urban runoff to the Santa Ana River during non-storm conditions. Following are the findings of this investigation.

1- Highgrove Channel:

The Highgrove Channel discharges to the Santa Ana River on the southeast bank and follows several abraided channels prior to the confluence with the main stem of the Santa Ana River. As shown below, the Highgrove Channel is dry under non-storm flow conditions and has no impact on the flow of the Santa Ana River.



High Grove Channel outlet structure to Santa Ana River.

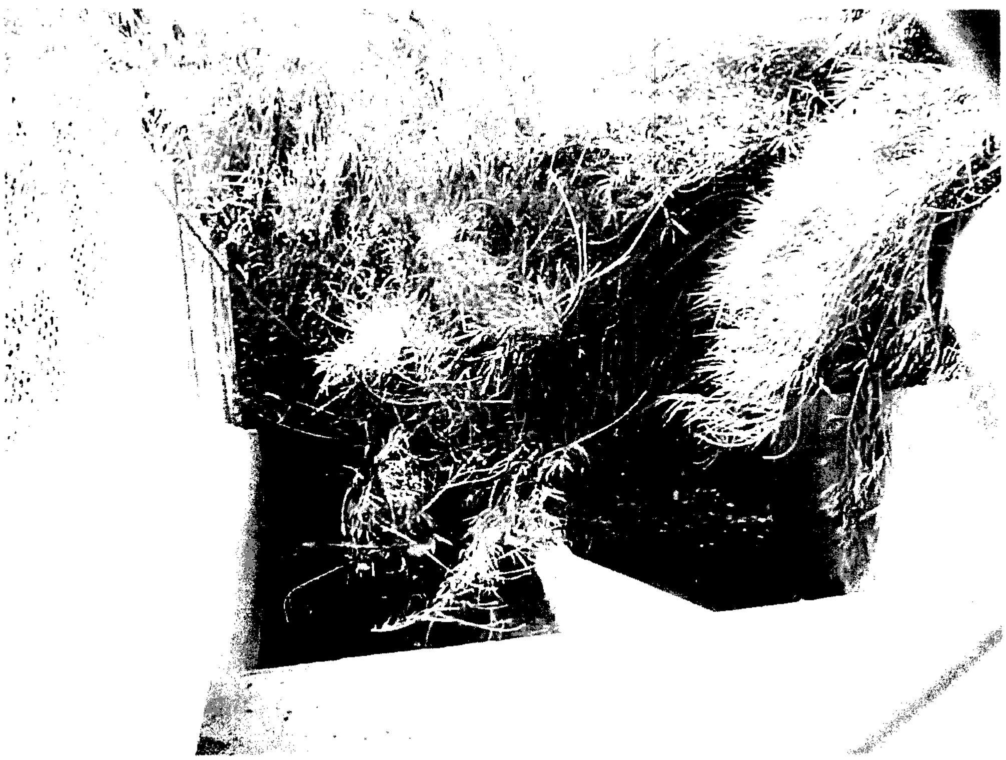
Highgrove Channel upstream of outlet to Santa Ana River.

Highgrove Channel at outlet into the Santa Ana River.

Highgrove Channel outlet to Santa Ana River.   DRY.

2- Agua Mansa Storm Drain:

The Agua Mansa Storm Drain outlets on the northwest bank of the Santa Ana River across from the Highgrove Channel. The typical non-storm flows from the Agua Mansa Storm Drain are less than 0.01 CFS and the flows in the Santa Ana River main stem are more than 500 feet away from the outlet. The flow in the Santa Ana River main stem at this location is approximately 10 cfs. Therefore, the Agua Mansa Storm Drain has negligible impact on the Santa Ana main stem flows.



Agua Mansa Storm Drain outlet.

Agua Mansa Storm Drain Outlet inside of energy dissipater.

3- Box Springs Channel:

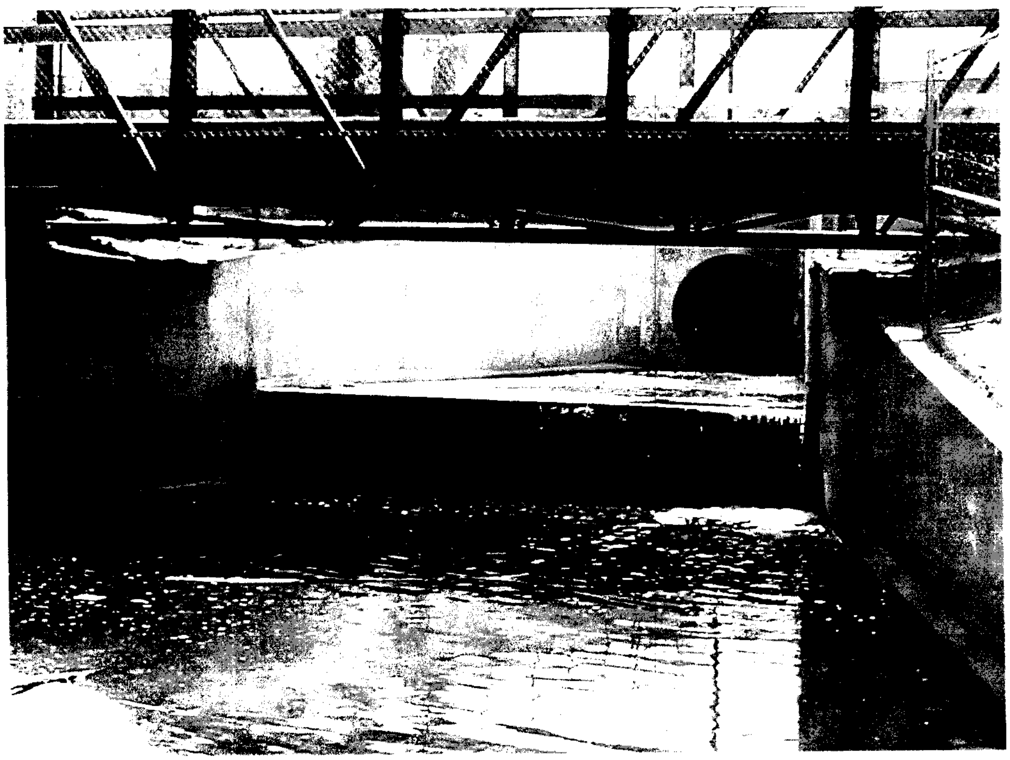
The non-storm flow in the Box Springs Channel is typically 0.20 CFS or less. The photos below shows temporary agricultural irrigation water discharges into the Box Springs Channel. The low flows must traverse 5500 ft of vegetated water course to get to the Santa Ana River. The estimated non-storm flow in the Santa Ana River at this location is 50 – 100 CFS. Therefore, the non-storm flows Box Springs Channel have a negligible impact on the flow in the Santa Ana River.

Box Springs Channel upstream of outlet

Box Springs Junction to Santa Ana River bottoms 1 mile down stream of outlet.

Magnolia Center Storm Drain:

The flow in the Magnolia Center Storm Drain is typically about 0.25 CFS during non-storm conditions. The low flows were traced out into the Santa Ana River about 350 ft. The flows spread out in the heavily vegetated river bottom and are either taken up by the plants or infiltrated and do not reach the Santa Ana River main stem flows. At this location the non-storm flow in the Santa Ana River is approximately 100-150 CFS. Therefore, the non-storm flows from the Magnolia Center Storm Drain have no impact on the flows in the Santa Ana River main stem.



Magnolia Center Storm Drain Outlet.

Magnolia Center Storm Drain outlet flows into Santa Ana River bottom.

Magnolia Center Storm Drain infiltration area.

Magnolia Center Storm Drain outlet area.

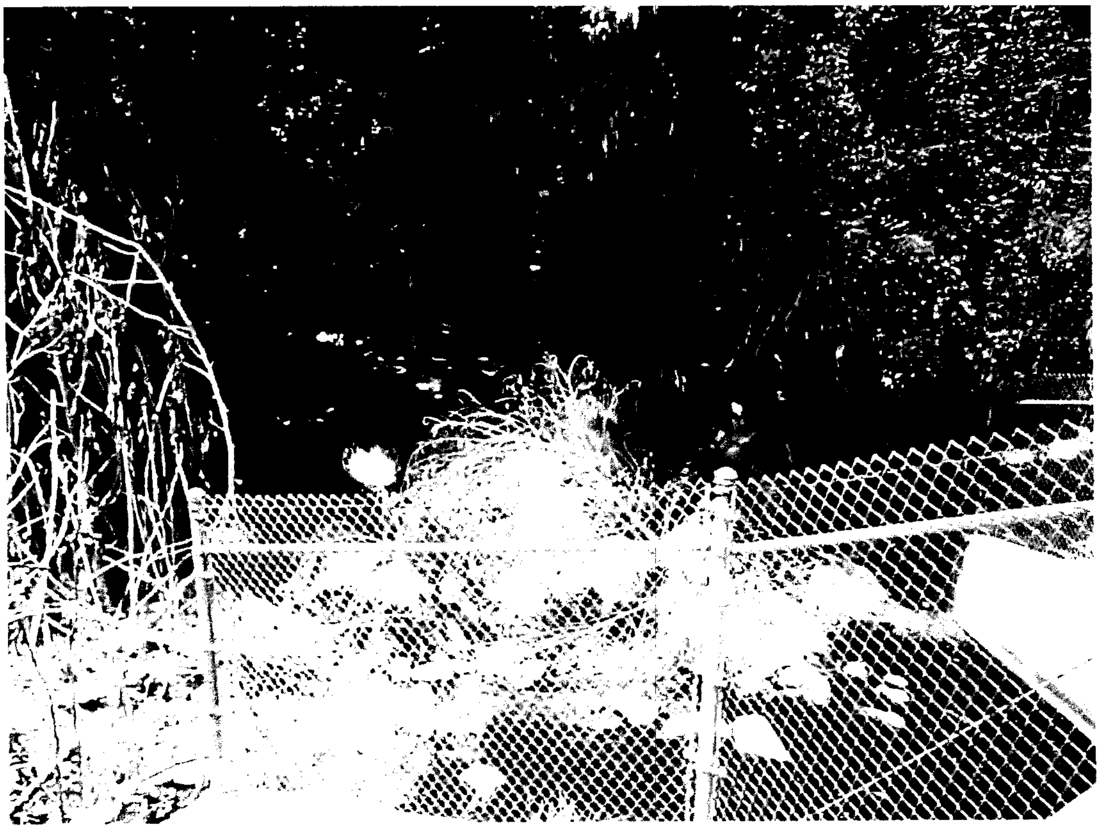
Magnolia Center Storm Drain flows in Santa Ana River bottom.

Magnolia Center Storm Drain outlet area.

Magnolia Center Storm Drain bio-filtration.

Phoenix Avenue Storm Drain:

The non-storm discharge from the Phoenix Avenue Storm Drain is less than 0.02 CFS. As evidenced in the photo below, the non-storm flows will not reach the Santa Ana River main stem. At this location the flow in the Santa Ana River main stem is approximately 200 CFS. Therefore, the Phoenix Avenue Storm Drain will have no impact on the Santa Ana River main stem flows.



Phoenix Avenue Storm Drain Outlet.

Phoenix Avenue Storm Drain Outlet pipe into energy dissipater.

6- Sunnyslope Channel:

The Sunny Slope Channel non-storm flows consist primarily of rising ground water with an average flow rate of 3.1 CFS at the end of the concrete channel. These flows continue through a meandering stream 1000+/- ft to the Santa Ana River main stem flows. At this location, the non-storm flow in the Santa Ana River main stem is approximately 200 CFS. As shown in the following photos, the 3.1 CFS of flow from the Sunnyslope Channel contributes less than 2% of the flow in the Santa Ana River main stem.

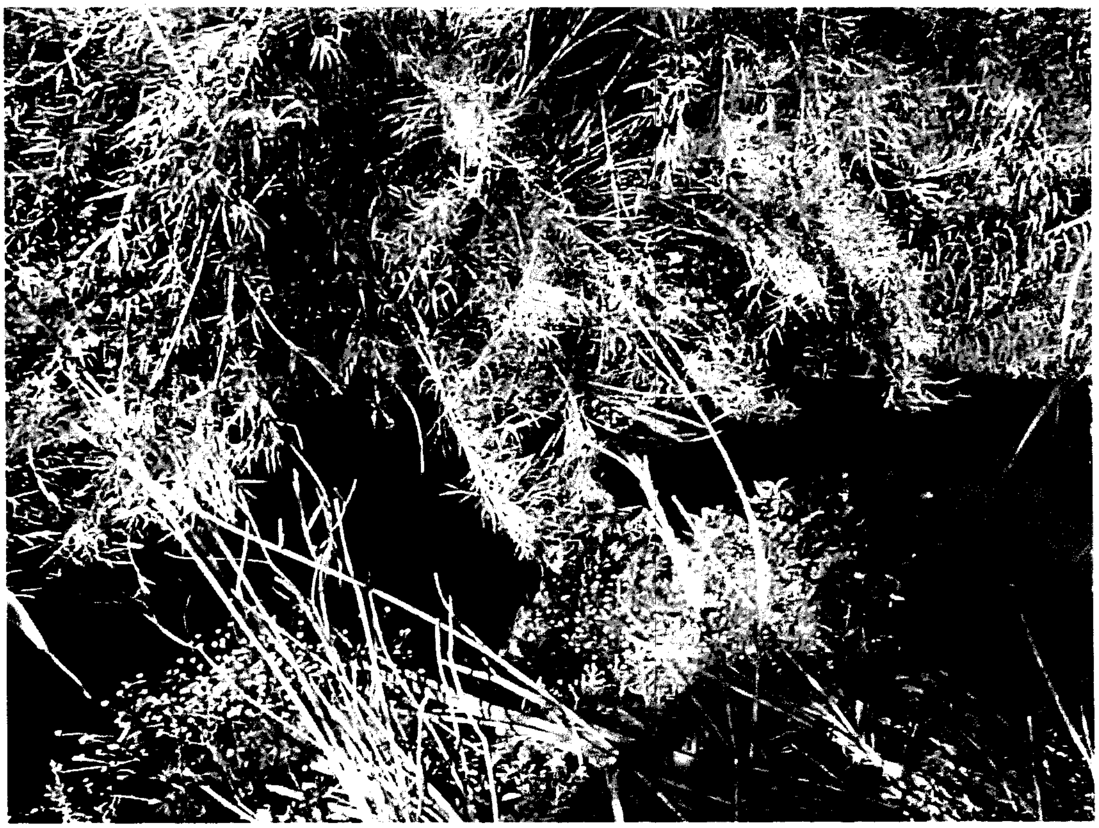
In the reach of the Santa Ana River main stem between the Mission Boulevard bridge and the Sunnyslope Channel outfall, there is a significant increase in non-storm flows. Flood Control Maintenance personnel have observed a significant contribution from rising ground water to the Santa Ana River main stem flows in this area. There are no side channel or POTW flows in this reach.

Sunnyslope Channel flows confluencing with Santa Ana River

Sunnyslope Channel at outlet into natural stream.

Anza and Monroe Channels:

Anza and Monroe Channels flow through Hole Lake and then through several thousand feet of natural stream beds before it confluences with the POTW flows from the Riverside Treatment Plant upstream of the Santa Ana River main stem. The flow from the Anza and Monroe Channels is about 1.5 CFS and the POTW flows are greater than 50 CFS. These commingled flows then flow through heavily vegetated river bottoms to the Santa Ana main stem flows. At this location the flow in the Santa Ana River main stem is approximately 100 – 150 CFS. The Anza and Monroe Channels contribute approximately 1% of the flow in the Santa Ana River main stem.



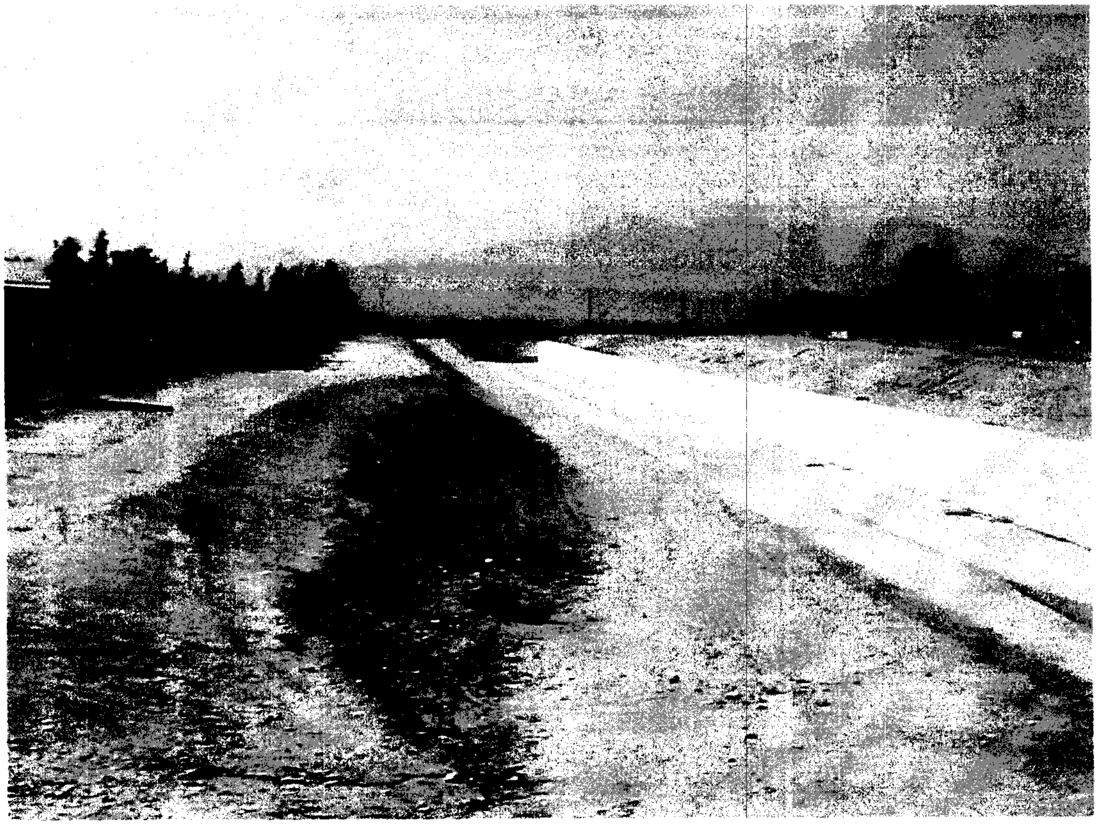
Anza and Monroe Channel flows mixing with Riverside POTW flows.

Riverside POTW flows from the right.

Confluence of Monroe and Anza Channels.

San Sevaine Channel:

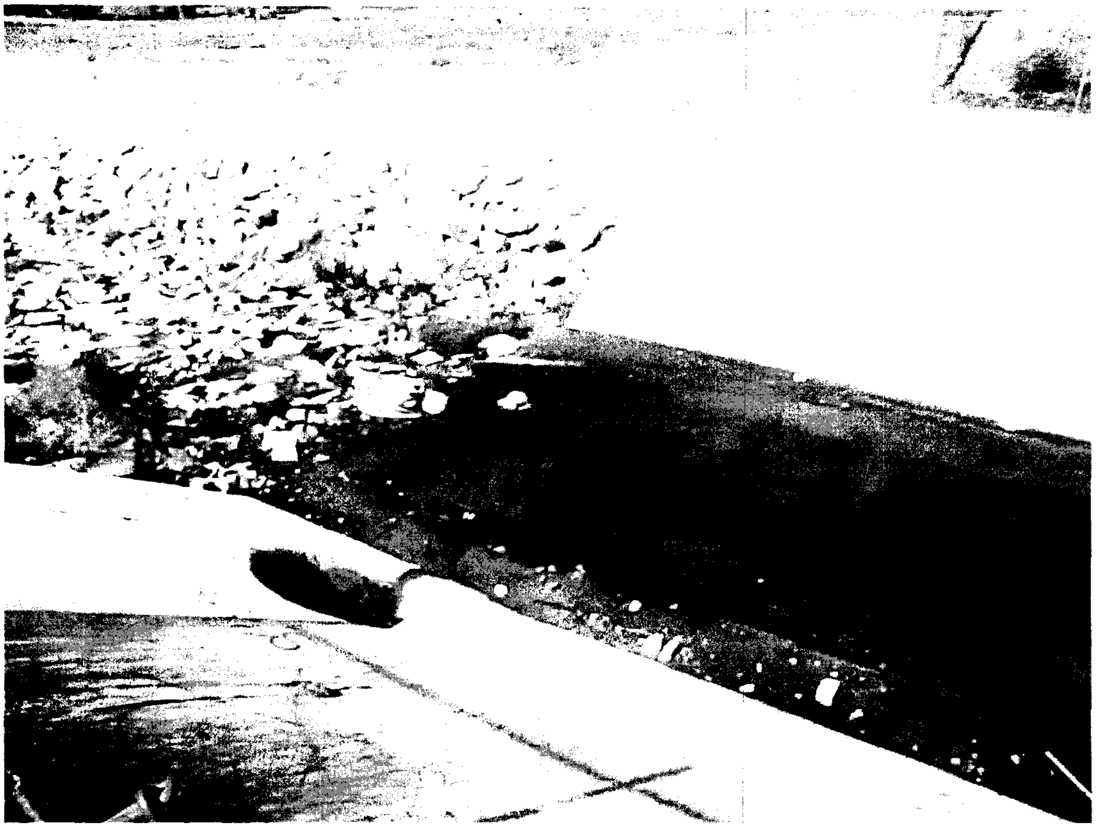
San Sevaine Channel enters on the north side of the Santa Ana River and carries flows from a large tributary area in San Bernardino and Riverside County. As shown in the following photo, the San Sevaine Channel seldom if ever carries any non-storm flows to the Santa Ana River main stem.



San Sevaine Channel near Limonite.

8- Day Creek Channel:

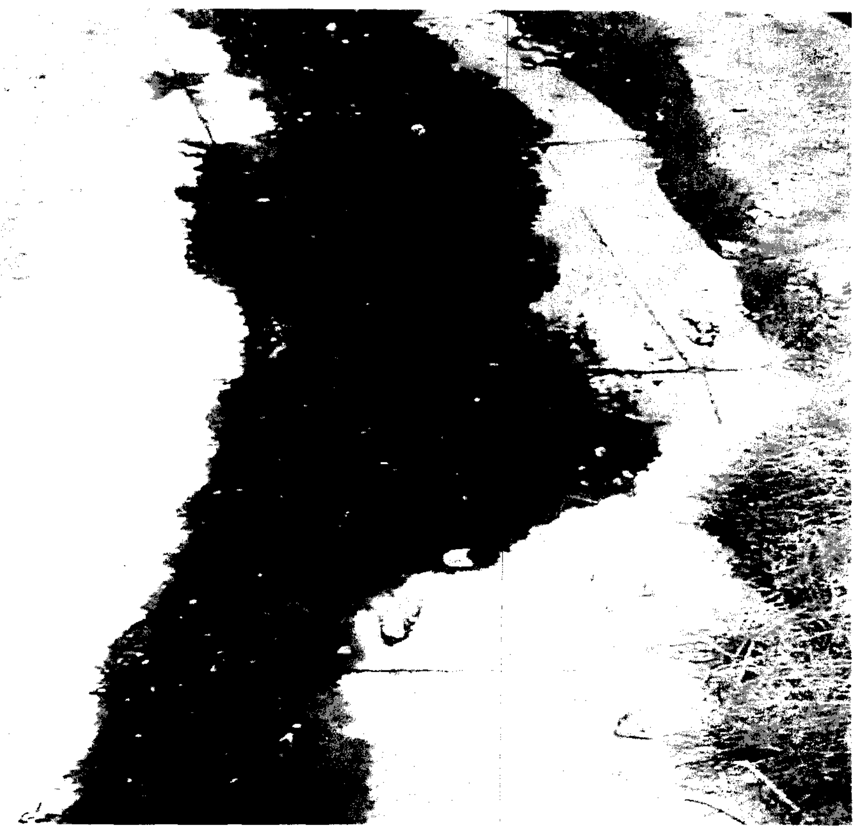
Day Creek Channel drains a large tributary area that contains many mixed land uses. The non-storm flows average about 0.2 CFS and infiltrate soon after leaving the concrete section and before reaching the Santa Ana River main stem. Non-storm flows from Day Creek do not influence flows in the Santa Ana River main stem.



Day Creek Channel outlet.

North Norco Channel:

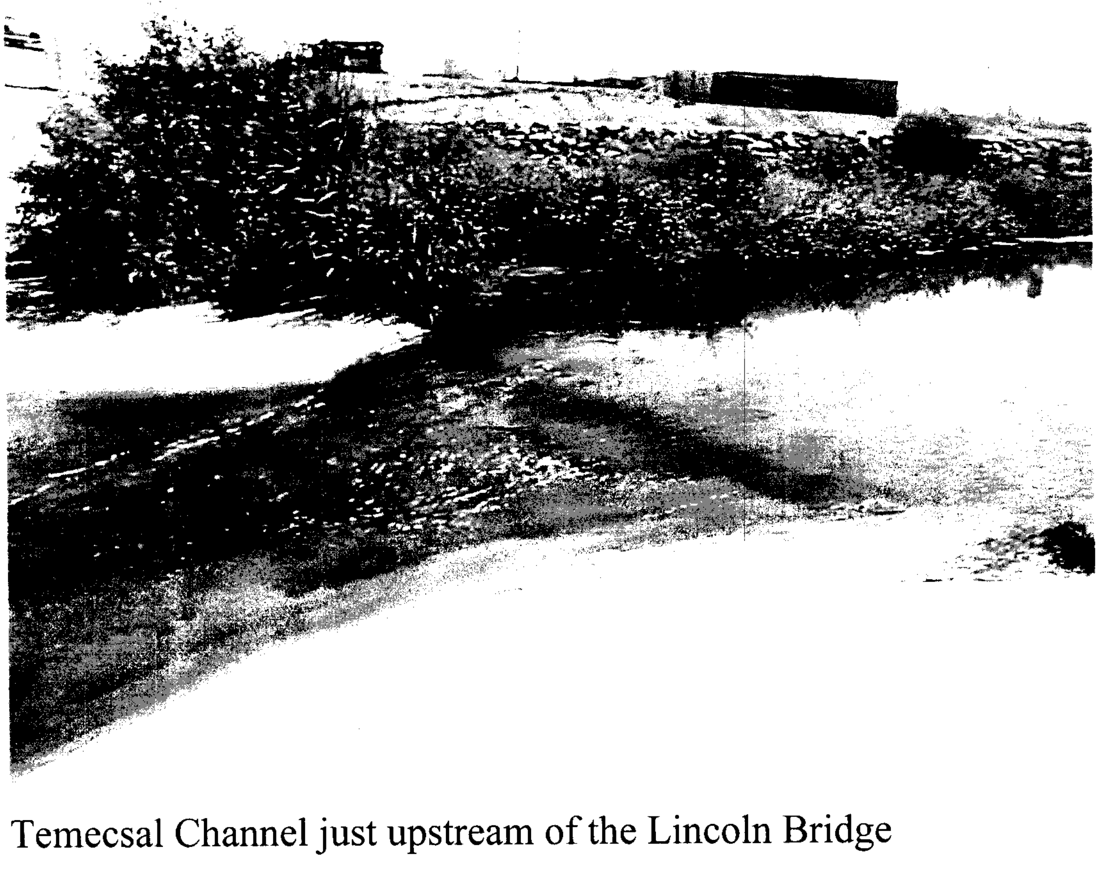
North Norco Channel flows into Prado Basin. At the end of the concrete channel the trickle flows (0.01 CFS) infiltrate before emptying into the Prado Basin. The influence of North Norco Channel on the Santa Ana River main stem flows is therefore negligible.



North Norco Channel downstream of River Road

9- Temescal Channel at Lincoln:

Temescal Channel drains a very large area of Riverside and Corona. The flow rate in Temescal Channel on the 28 May 2002 was 11.3 CFS and consists primarily of rising groundwater. This flow is typical of the non-storm flows observed in Temescal Channel. When the flows leave Temescal Channel at Lincoln Street they must flow through 3600 feet of riparian habitat before entering the Prado Basin. The flow of the Santa Ana River main stem to the Prado Basin is approximately 200 CFS. Additional flows from Chino Creek, Cucamonga Creek and other tributaries also discharge to the Prado Basin. Therefore, the effect of 11.3 CFS from Temescal Channel on the total non-storm inflow to Prado is very small.



Temecsal Channel just upstream of the Lincoln Bridge

Temescal Channel downstream of Lincoln Avenue Bridge

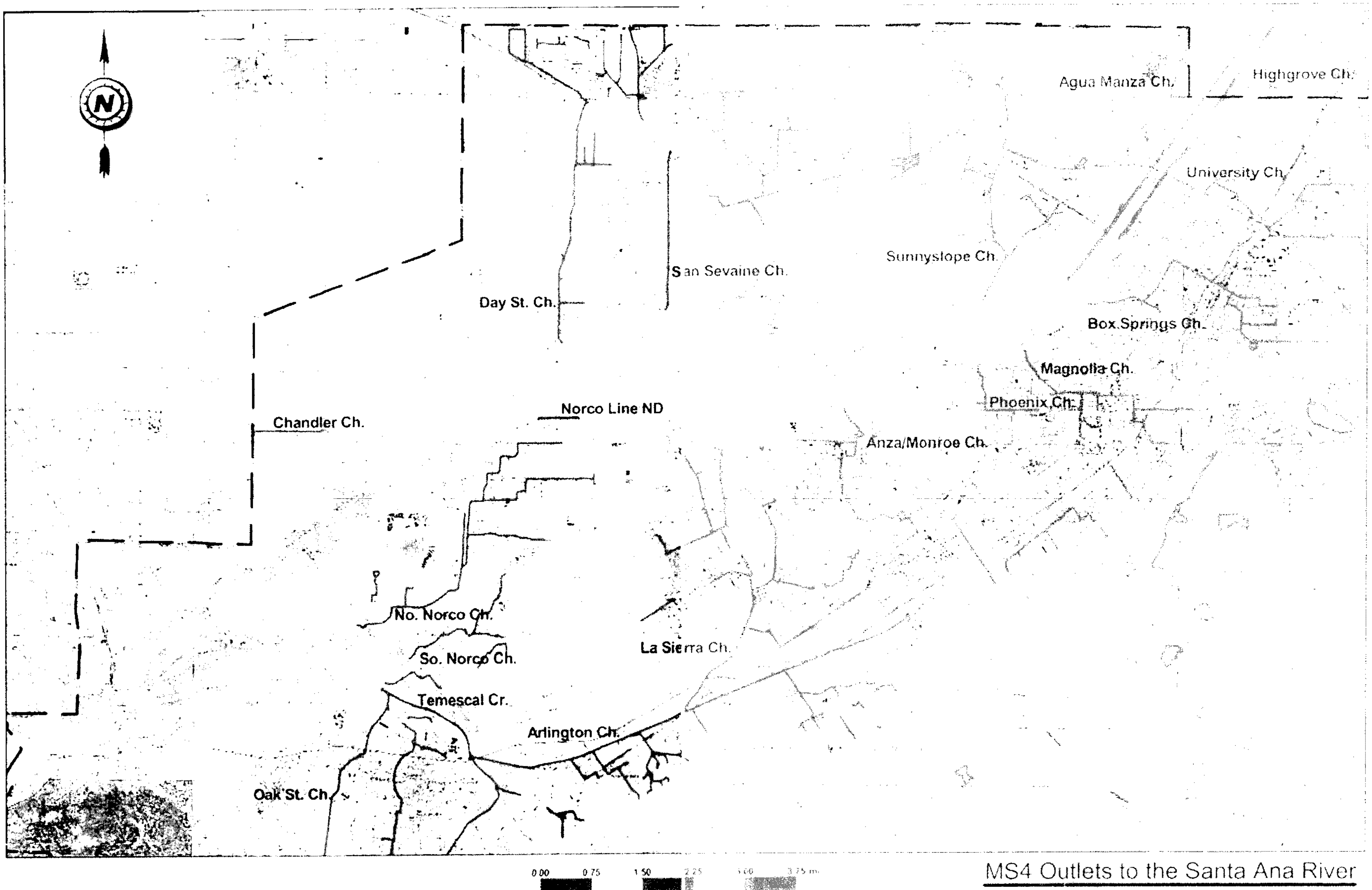
South Norco Channel:

The South Norco Channel flows into Prado Basin. The non-storm flows in the South Norco Channel are less than 0.02 CFS and infiltrate into the natural channel soon after leaving the concrete and before reaching the Prado Basin. Therefore, the non-storm flows from the South Norco Channle have no effect on the Prado Basin.

South Norco Channel looking downstream of River Road

Conclusions:

Nine of the twelve RCFC outfalls to the Santa Ana River investigated had insignificant non-storm flows and significant down stream infiltration zones before their confluence with the Santa Ana River main stem. Three of the twelve outfalls did have non-storm flows to the Santa Ana River main stem flows, but their contributions are not significant (1 to 2 % of total flow).



MS4 Outlets to the Santa Ana River

May 30, 2002

Santa Ana Region
BACTEE Analysis
Stations 329, 364, 383, 707, 754, 829, 830

Station	Sampnum	Date	Time	Variable	Accuracy	Value	Flag	Quality	Sample Src	Coll Auth	Coll Meth	Pres Meth	Pres Meth	Lab ref	Labsampref	Recdate
329	73	8/12/1997	1450	1075	5	5000		1	AQ	RF	DI	CH		BAB	L32090-005	8/12/1997
329	010510B421	5/10/2001	1200	1075	5	3000		1	AQ	RF	DI			BAB	010510B421	
364	224	2/22/1996	1245	1075	5	9000		1	AQ	RF	DI	CH	PR	BAB		
364	010509B349	5/9/2001	1400	1075	5	0		1	AQ	RF	DI			BAB	010509B349	
707	378	3/31/1998	2200	1075	5	70000		1	AQ	RF	DI	CH		BAB	L40038-002	4/1/1998
383	010510B422	5/10/2001	1100	1075	5	500		1	AQ	RF	DI			BAB	010510B422	
754	756	3/5/1996	1040	1075	5	13000		1	AQ	RF	DI	CH	PR	BAB		
754	760	11/22/1996	1020	1075	5	30000		1	AQ	RF	DI	CH	PR	BAB	L23611-002	11/22/1996
754	421-B736	4/21/2000	1035	1075	5	1700		1	AQ	RF	DI			BAB	421-B736	
754	10412B458B	4/12/2001	1220	1075	5	170		1	AQ	RF	DI			BAB	10412B458B	
754	010801B63A	8/1/2001	1330	1075	2	300		1	AQ	RF	DI	CH		BAB	010801B63A	
754	20430B1004	4/29/2002	1855	1075	0	170		1	AQ	RF					20430B1004	
754	20617B589	6/17/2002	1145	1075	2	280		1	AQ	RF					20617B589	
754	020912B433	9/12/2002	1125	1075	99	130		1	AQ	RF	DI			BAB	020912B433	
754	021011B455	10/11/2002	1145	1075	5	500		1	AQ	RF	DI			BAB	021011B455	
754	021212B454	12/12/2002	1115	1075	5	230		1	AQ	RF	DI			BAB	021212B454	
754	030127B898	1/27/2003	954	1075	5	170		1	AQ	RF	DI			BAB	030127B898	
754	030219B558	2/19/2003	847	1075	5	220		1	AQ	RF	DI			BAB	030219B558	
754	030320B692	3/20/2003	1030	1075	5	500		1	AQ	RF	DI			BAB	030320B692	
754	030425B912	4/25/2003	1000	1075	5	110		1	AQ	RF	DI			BAB	030425B912	
754	030528B938	5/28/2003	1050	1075	99	230		1	AQ	RF	DI			BAB	030528B938	
754	030624B818	6/24/2003	1055	1075	99	300		1	AQ	RF	DI			BAB	030624B818	
754	030731B968	7/31/2003	1055	1075	99	13000		1	AQ	RF	DI			BAB	030731B968	
754	030829B912	8/29/2003	1105	1075	99	230		1	AQ	RF	DI			BAB	030829B912	
754	A3I1952-03	9/26/2003	1100	1075	5	300		1	AQ	RF	DI			BAB	A3I1952-03	
754	A3J1852-03	10/23/2003	1115	1075	5	230		1	AQ	RF	DI			BAB	A3J1852-03	10/23/2003
754	A3K1960-03	11/25/2003	1110	1075	99	800		1	AQ	RF	DI			BAB	A3K1960-03	
754	A3L1925-03	12/23/2003	1030	1075	99	300		1	AQ	RF	DI			BAB	A3L1925-03	
754	A4A1079-03	1/16/2004	1115	1075	5	300		1	AQ	RF	DI			BAB	A4A1079-03	
754	A4C1118-03	3/12/2004	1100	1075	5	220		1	AQ	RF	DI			BAB	A4C1118-03	
754	A4D1603-03	4/21/2004	1035	1075	5	500		1	AQ	RF	DI			BAB	A4D1603-03	
754	A4E1655-03	5/21/2004	1120	1075	5	230		1	AQ	RF	DI			BAB	A4E1655-03	
754	A4F2243-03	6/28/2004	1115	1075	5	220										
754	A4G2462-03	7/30/2004	0:00	1075		110										
754		9/1/2004	1150	1075		220										
754		9/30/2004	1140	1075		300										
754		11/10/2004	1330	1075		800										

Station	Sampnum	Date	Time	Variable	Accuracy	Value	Flag	Quality	Sample Src	Coll Auth	Coll Meth	Pres Meth	Pres Meth	Lab ref	Labsampref	Recdate
829	505-B249-1	5/5/2000	920	1075	5	30		1	AQ	RF	DI			BAB	505-B249-1	
829	620-B715-1	6/20/2000	1005	1075	5	40		1	AQ	RF	DI			BAB	620-B715-1	
829	10412B457B	4/12/2001	1050	1075	5	70		1	AQ	RF	DI			BAB	10412B457B	
829	010801B65A	8/1/2001	1045	1075	2	300		1	AQ	RF	DI	CH		BAB	010801B65A	
829	20430B1003	4/29/2002	1730	1075	0	80		1	AQ	RF	DI	CH		BAB	20430B1003	
829	020617B590	6/17/2002	1045	1075	0	500		1	AQ	RF	DI	CH		BAB	020617B590	
829	020912B432	9/12/2002	1040	1075	5	300		1	AQ	RF	DI			BAB	020912B432	
829	021011B454	10/11/2002	1100	1075	5	130		1	AQ	RF	DI			BAB	021011B454	
829	021212B453	12/12/2002	1030	1075	5	80		1	AQ	RF	DI			BAB	021212B453	
829	030127B899	1/27/2003	1142	1075	99	20		1	AQ	RF	DI			BAB	030127B899	
829	030219B559	2/19/2003	1034	1075	5	70		1	AQ	RF	DI			BAB	030219B559	
829	030320B691	3/20/2003	942	1075	5	230		1	AQ	RF	DI			BAB	030320B691	
829	030320B693	3/20/2003	942	1075	2	300		1	AQ	RF	DI			BAB	030320B693	
829	030425B911	4/25/2003	853	1075	5	20	<	1	AQ	RF	DI			BAB	030425B911	
829	030528B937	5/28/2003	1000	1075	5	600		1	AQ	RF	DI			BAB	030528B937	
829	030624B817	6/24/2003	950	1075	5	20		1	AQ	RF	DI			BAB	030624B817	
829	030731B967	7/31/2003	955	1075	5	500		1	AQ	RF	DI			BAB	030731B967	
829	030829B911	8/29/2003	950	1075	5	800		1	AQ	RF	DI			BAB	030829B911	
829	A3I1952-02	9/26/2003	940	1075	5	170		1	AQ	RF	DI			BAB	A3I1952-02	
829	A3J1852-02	10/23/2003	1025	1075	5	230		1	AQ	RF	DI			BAB	A3J1852-02	10/23/2003
829	A3K1960-02	11/25/2003	1025	1075	99	70		1	AQ	RF	DI			BAB	A3K1960-02	
829	A3L1925-02	12/23/2003	935	1075	5	130		1	AQ	RF	DI	CH		BAB	A3L1925-02	
829	A4A1079-02	1/16/2004	1015	1075	5	20		1	AQ	RF	DI			BAB	A4A1079-02	
829	A4C1118-02	3/12/2004	1005	1075	5	300		1	AQ	RF	DI			BAB	A4C1118-02	
829	A4D1603-02	4/21/2004	935	1075	5	300		1	AQ	RF	DI			BAB	A4D1603-02	
829	A4E1655-02	5/21/2004	1020	1075	99	20	<	1	AQ	RF	DI			BAB	A4E1655-02	
829	A4F2243-02	6/28/2004	1000	1075	5	500										
829	A4G2462-02	7/30/2004	1055	1075		230										
829	A4I2501-02	9/30/2004	1045	1075		230										
829		11/10/2004	1220	1075		170										
830	505-B249-2	5/5/2000	1010	1075	5	170		1	AQ	RF	DI			BAB	505-B249-2	
830	620-B715-2	6/20/2000	910	1075	5	70		1	AQ	RF	DI			BAB	620-B715-2	
830	10412B457A	4/12/2001	1010	1075	5	40		1	AQ	RF	DI			BAB	10412B457A	
830	010801B65	8/1/2001	945	1075	2	230		1	AQ	RF	DI	CH		BAB	010801B66	9/10/2002
830	20430B1002	4/29/2002	1855	1075	0	130		1	AQ	RF	DI	CH		BAB	20430B1002	
830	020617B591	6/17/2002	950	1075	0	110		1	AQ	RF	DI	CH		BAB	020617B591	6/17/2002
830	020912B432	9/12/2002	955	1075	5	110		1	AQ	RF	DI			BAB	020912B432	
830	021011B454	10/11/2002	1030	1075	5	80		1	AQ	RF	DI			BAB	021011B454	
830	021212B453	12/12/2002	940	1075	5	20		1	AQ	RF	DI			BAB	021212B453	
830	030127B898	1/27/2003	1055	1075	5	20	<	1	AQ	RF	DI			BAB	030127B898	
830	030219B558	2/19/2003	945	1075	5	20		1	AQ	RF	DI			BAB	030219B558	
830	030320B691	3/20/2003	845	1075	5	1300		1	AQ	RF	DI			BAB	030320B691	
830	030425B910	4/25/2003	820	1075	5	20	<	1	AQ	RF	DI			BAB	030425B910	
830	030528B936	5/28/2003	920	1075	5	40		1	AQ	RF	DI			BAB	030528B936	
830	030624B817	6/24/2003	850	1075	5	130		1	AQ	RF	DI			BAB	030624B817	
830	030731B967	7/31/2003	915	1075	5	800		1	AQ	RF	DI			BAB	030731B967	
830	030829B911	8/29/2003	915	1075	5	70		1	AQ	RF	DI			BAB	030829B911	
830	A3I1952-01	9/26/2003	910	1075	99	20		1	AQ	RF	DI			BAB	A3I1952-01	
830	A3J1852-01	10/23/2003	950	1075	5	70		1	AQ	RF	DI			BAB	A3J1852-01	10/23/2003
830	A3K1960-01	11/25/2003	1000	1075	99	40		1	AQ	RF	DI			BAB	A3K1960-01	
830	A3L1925-01	12/23/2003	915	1075	5	40		1	AQ	RF	DI	CH		BAB	A3L1925-01	
830	A4A1079-01	1/16/2004	935	1075	99	20	<	1	AQ	RF	DI			BAB	A4A1079-01	
830	A4C1118-01	3/12/2004	925	1075	5	20	<	1	AQ	RF	DI			BAB	A4C1118-01	
830	A4D1603-01	4/21/2004	905	1075	5	20	<	1	AQ	RF	DI			BAB	A4D1603-01	
830	A4E1655-01	5/21/2004	945	1075	5	20		1	AQ	RF	DI			BAB	A4E1655-01	
830	A4F2243-01	6/28/2004	900	1075	5	20										
830	A4G2462-01	7/30/2004	1015	1075		40										
830		11/10/2004	1140			ND										

SAN BERNARDINO COUNTY STORMWATER PROGRAM

A Consortium of Local Agencies

825 East Third Street
San Bernardino, CA 92415-0835
(909) 387-8112 / FAX 387-8130

Member Agencies

City of Big Bear Lake
City of Chino
City of Chino Hills
City of Colton
City of Fontana
City of Grand Terrace
City of Highland
City of Loma Linda
City of Montclair
City of Ontario
City of Rancho Cucamonga
City of Redlands
City of Rialto
City of San Bernardino
City of Upland
City of Yucaipa
County of San Bernardino
San Bernardino County Flood Control District

March 17, 2005

Gerard J. Thibeault
California Regional Water Quality Control Board, Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

File#10(NPD)-5.02

Subject: Comments on the Staff Report on the Bacterial Indicator Total Maximum Daily Loads in the Middle Santa Ana River Watershed

Dear Mr. Thibeault:

We have recently reviewed the Staff Report on the Bacterial Indicator Total Maximum Daily Loads in the Middle Santa Ana River Watershed (Staff Report) that was presented at the Regional Board Public Workshop on February 3, 2005. The implementation of this Total Maximum Daily Load (TMDL) has substantial implications for the Permittees under the San Bernardino Municipal Stormwater Permit. The San Bernardino County Flood Control District (District), as the Principal Permittee, wishes to provide the following comments on the Staff Report.

We recognize that the development of this TMDL is a difficult and complex task, and appreciate the efforts of Regional Board staff. Nevertheless, we contend that the Staff Report does not adequately consider the uncertainties in the current understanding of the sources, transport, fate, and control measures for pathogen indicators. In addition, we suggest that Concentrated Animal Feeding Operations (CAFOs)—dairies in particular—are not fully compliant with their existing NPDES Permit, and are very likely a significant source of pathogen indicators. Other agricultural operations have not been adequately characterized and have not been included in the stakeholder process. We also believe that the efforts of the Storm Water Quality Standards Task Force (SWQSTF) are parallel to the needs of the TMDL, and should be recognized as a necessary early phase of the implementation plan. The SWQSTF is evaluating the appropriateness of existing recreational beneficial use designations in the Basin Plan, including existing uses and watershed conditions, to support the triennial review process. The SWQSTF includes Orange, Riverside, and San Bernardino Counties, the Regional Board, the U.S. Environmental Protection Agency, and other stakeholders. In addition to various minor issues and edits, the Staff Report also needs to include a more comprehensive and realistic economic analysis, and implementation of the TMDL may require a CEQA analysis. These comments are more thoroughly described below.

Recycled Paper

Technical/Scientific Issues

The overall environmental system, including the sources, transport, and transformations of bacterial indicators in the Santa Ana River (SAR) watershed, is not fully understood. Several research efforts in the southern California region, and elsewhere, are working to more accurately identify sources (including source typing to determine the relativecontribution of pathogen indicators from different mammalian species and birds), to determine the relationship of pathogen indicators to sediment (how and when do colonies establish in the environment and contribute to the measured concentrations), and to understand the overall behavior of these indicators in watersheds under various conditions[1]. The results of these and other studies should be considered in the development of compliance standards and the implementation plan for this TMDL.

It is understood that there are limitations to the data available for evaluation for the TMDL. Although the Staff Report describes sampling locations and laboratory results, it does not provide any information about the assumptions (implicit or explicit) underlying data collection, site selection, data evaluation or conclusions. The Staff Report should list all of the assumptions involved, and evaluate how they impact the inferences or conclusions presented. Similarly, there are uncertainties in the data and evaluations that are not adequately described. One mechanism for describing assumptions and uncertainties would be to provide a much more complete description of sampling methodologies and site selection criteria, e.g., were all of the data from grab samples? This is not clearly described.

The Staff Report does not adequately address fecal contamination from agriculture and from dairies, in particular. The Staff Report states, "dairy operations in compliance with this requirement would not be a source of bacterial indicators..." (Section 5.2.3). Although the "dairy permit" (Regional Board Order No. 99-11; NPDES No. CAG018001) prohibits discharges from dairies unless generated from rainfall in excess of the 25-year, 24-hour storm, the District and other Permittees have documented repeated unauthorized discharges from dairies in the watershed for over ten years[2]. During the most recent rain events, numerous polluted discharges were observed, even though the 25-year storm threshold was not exceeded. These discharges were not sampled; but, as the Staff Report states (Section 3.1), certainly contain high levels of bacterial indicators and other pollutants. Although the dairy permit has been in place for over five years, we have documented that numerous dairies have been repeatedly out of compliance. The District and other Permittees have reported these discharges to the Regional Board, but it appears that little has changed in the way these

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[1] See the following:

- Abstracts in the attachment "National Beached Conference Abstracts";
- Griffith et al.; Harwood et al., Myoda et al.; Field et al; Nobel et al.; Ritter et al.; and Stewart et al. 2003. *Journal of Water and Health*, 01.4, p. 141-231;
- http://www.ocwatersheds.com/watersheds/Aliso_reports_studies.asp for reports on the Aliso Creek Watershed;
- Reeves, R. L., Grant, S. B., Morse, R. D., Copil Oancea, C. M., Sanders, B. F., and A. B. Boehm, 2004. Scaling and management of fecal indicator bacteria in runoff from a coastal urban watershed in southern California. *Environmental Science and Technology*, 38: 2637-2648;
- Hyer and Moyer, 2004. Enhancing fecal coliform total maximum daily load models through bacterial source tracking. *Journal of the American Water Resources Association* 40(6): 1511-1526.

[2] Documentation available from the District on request.

facilities operate. Therefore, we contend that the dairy permit has not been effective, and that the first priority for this TMDL should be to bring these facilities into compliance, and then reassess the level of impairment in the affected reaches. Until these illegal discharges are controlled, areas downstream from these facilities will have continuing impairments, regardless of other pathogen control practices.

We understand that Publicly Owned Water and Wastewater Treatment Works (POTWs) are required to monitor their effluent, and that, most of the time, their monitored effluent meets permit requirements. However, we disagree with conclusion 4 in Section 5.5. As stated in the text and Table 13 (Section 5.2.4), POTWs do have exceedences of their limits and, therefore, are a source of pathogen indicators. Additional monitoring and evaluation are warranted to more accurately characterize the magnitude and impact of these exceedences.

Several recent and ongoing studies have provided strong evidence that bacterial indicators survive and reproduce in the environment (see reference in footnote 1 on Page 2; there are many more published studies not listed here). The Staff Report states in Section 5.3 that there are "some indications" that environmental regrowth can occur and that more research is needed; however, the reports cited are several years old and were not conducted in California (one in Florida and one in Australia). This indicates that the background research for the TMDL is inadequate and, therefore, should be updated with all relevant study results, especially those from the southern California region, and from the SAR watershed, in particular (e.g., ongoing work by Dr. Stanley Grant and colleagues from the University of California at Irvine). We believe that the current scientific consensus is that regrowth in the environment definitely occurs, and should be accounted for in the TMDL allocations. Further, bacterial behavior, including various sources and regrowth in the environment, must be understood if the TMDL is to succeed.

Pathogens from natural sources are not adequately characterized in the Staff Report. While most data from open space show demonstrably lower levels of pathogen indicators, natural samples occasionally produce surprisingly high indicator densities (Santa Ana River above Seven Oaks Dam: median of 2,540 MPN/100 mL for 2003/04 wet season). Urban Stormwater Management programs should not be required to control these sources. A question to be asked is, if these natural sources are regrowing in the environment, how will the TMDL account for this?

Dry and wet weather conditions should be evaluated separately with regard to data collection, the appropriateness of the Water Quality Objectives (WQOs), and the economic evaluation. The cost of Best Management Practices (BMPs) necessary to treat storm runoff were not included in the cost evaluation, even though the Staff Report states that the TMDL applies to both storm and non-storm flows.

Process

The Staff Report should more explicitly anticipate the expected revisions to the WQOs and bacterial indicators that are likely to be adopted in the near future (E. Coli and/or enterococci) based on recommendations from the U.S. Environmental Protection Agency. These revisions are mentioned (Section 2.5 and 2.6) and the need to revise the TMDL is acknowledged; however, the Staff Report should state a clear intent to reopen the TMDL to incorporate these new indicators, and provide a discussion of how the implementation plan would be impacted. It might even be appropriate to consider the present Basin Plan WQO for fecal coliform to be an *interim* WQO, pending consideration of the USEPA recommendations. The objective here is to minimize duplication of effort.

Additional sources of pathogens may exist at facilities under the General Industrial Stormwater Permit—especially food processing or waste and green waste operations. These facilities should be required to test their discharges for the appropriate bacterial indicators, and implement pathogen indicator-specific BMPs, if needed, under their State NPDES General Stormwater Permit. We recommend that this be added as an action item under Task 1.

Task 2 requires the Regional Board to develop a list of all involved agricultural operators that will need to implement TMDL requirements. We agree that these stakeholders should be involved, but suggest that they should have already been identified and should have been brought into the work group early on. Had this been accomplished, there might have been better characterization of their relative contribution as a source. We urge the Regional Board to undertake Task 2 immediately, rather than wait for TMDL adoption.

The Staff Report briefly describes the "Chino Basin Pathogen TMDL Phase II Monitoring and Modeling Program." This program should be much more thoroughly explained. How will the results of this modeling be used in the implementation plan? Will compliance be assessed with the model? We request that the Staff Report be revised to include a thorough description of the Phase II Program and how it will be used, including any anticipated costs for the dischargers, or implications for the monitoring program. Is the Phase II Program a separate source evaluation program?

Implementation of the TMDL will require extensive implementation of BMPs and changes to project features throughout the watershed. The Staff Report does not evaluate the potential environmental impacts of actions that will be triggered by the TMDL. Therefore, the CEQA checklist should be revised to include these potential impacts. For example, we suggest that a more accurate response for Question XVII.b would be "potentially significant impact." An evaluation should be made to determine whether the actions necessary to meet the relevant WQOs would cause more environmental harm than would be justified by the attainment of WQOs.

Economics

Generally, the cost evaluation is not specific enough to allow a realistic estimated cost of implementation. There are also assumptions in the cost estimates, including the implicit assumption that the BMPs can or will be effective, an assumption that has not yet been demonstrated in any watershed with pathogen impairments.

The economic estimate fails to consider whether BMPs will be effective, does not name specific BMPs that have been proven effective for pathogen indicators, and does not estimate cost on a watershed-wide basis. For example, the cost of street sweeping is given, but we are not aware that street sweeping is an effective BMP for pathogens. Similarly, for public education, we are not aware of any clear demonstrations that water quality has improved as a result of education in municipal stormwater. In fact, the recent study of the Aliso Creek watershed demonstrates that water quality did not improve following focused outreach. Further, it is misleading to include cost estimates for BMPs that are not effective, or to include cost estimates without any discussion of how much of the watershed the BMP will cover. As an example, the first paragraph under Section 11.2 estimates costs for "similar control measures proposed for areas within the Region" that "would reduce discharge of pathogens..." The Staff Report then provides a cost ranging from $200,000 to $600,000, but does not state whether this cost is for BMP implementation on a watershed-wide scale, in a small catchment area, or for a single project site. Without an estimate of the area of BMP implementation, the cost estimates are, at best, not very helpful, or worse, misleading. These flaws apply to the estimates for all BMP categories listed in Section 11.2.

Overall, the cost estimates, as presented, greatly underestimate the cost of TMDL compliance. In addition, several cost areas are not addressed: the increased cost for compliance with requirements of the Water Quality Management Plans under the TMDL is not considered, nor is the cost for complying with the permitting and mitigation cost when the US Army Corps of Engineers Section 404 permits and associated Regional Board 401 Water Quality Certifications are required (as would be triggered by many wetland and diversion projects).

In Section 11.1, the statement is made: "Agricultural BMPs implemented could be the same as those implemented to address urban runoff." However, the specificity of the agricultural BMPs and their cost estimates have not been presented and are likely to differ from urban BMPs. We request that the Staff Report provide more specificity for these BMPs.

Finally, the economic analysis cannot be reasonably conducted without understanding what BMPs will ultimately be effective enough to meet WQOs. Identifying the appropriate BMPs will be problematic, if not impossible, until the sources, transport and fate of pathogen indicators are fully understood.

Monitoring

For San Bernardino and Riverside Counties, participation in the SWQSTF should be recognized as the first phase of the monitoring program. This effort is already underway and addresses the source and impairment issues. This effort will facilitate the implementation of the TMDL in various ways, including providing a coordinated committee to develop and evaluate monitoring plans and data, promoting watershed-wide stakeholder cooperation, and evaluating other implications of the TMDL, such as BMPs and economics. The San Bernardino County Stormwater Program has committed $400,000 to the SWQSTF effort from 2004-2006. This effort has already produced a set of technical memoranda and a consensus document from its first phase (see website: http://www.sawpa.org/projects/planning/stormwater.htm).

A sampling plan can be developed as well; however, the plan should be based on clear objectives. We request that the Staff Report include the objectives of the monitoring plan, and that monitoring stations and frequency follow from the objectives. For example, if the objective is to continue to populate the Phase II model (as described in Section 11.3), this should be stated. We also suggest that the requirement for a group monitoring plan involving all the agencies listed in Task 3 be deleted. We would prefer that monitoring be done (at least initially) under existing programs, such as the Stormwater programs. It is time-consuming to develop new workgroups and would add an unnecessary burden at the outset without improving the monitoring. As the monitoring plan is implemented over the first few years, a more comprehensive monitoring workgroup might develop. Finally, there is no basis for the need for quarterly reports from the monitoring program. We request that this requirement be amended to require reporting on an annual basis.

The implementation plan for the TMDL should have provisions for reopening outside the triennial review timeframe, if appropriate.

The Basin Plan Amendment (BPA) includes several deadlines for submittal of documents to the Regional Board. We request that the BPA also include timelines for response and/or approval of these documents by the Regional Board.

Additional Specific Comments

- Water transfers are shown on some of the hydrographs (e.g., Figure 8), yet are not discussed in the text. How do these discharges impact the indicators? Does this implicate the water purveyor as a source under the TMDL? If there is contaminated sediment—will it then be transported? Or could water transfers be used as a BMP? Unless these water transfers are to cease, we suggest that these concerns must be addressed by the Staff Report.

- On Figure 2, the map text and relevant features are too small and difficult to read.

- In Section 2.4.3, there is no evidence to substantiate the statement that is made in the last sentence in the paragraph on page 28. This sentence appears to state that little stormwater runoff from natural areas gets beyond the recharge areas. Please provide more evidence for this assertion.

- Figure 21 appears to be labeled incorrectly. Hydrograph data elsewhere in the report suggest that samples taken on 10/25/96, 10/30/96 and 11/21/96 were low flow samples.

- In Section 5.2.3, it is not explained why agricultural samples were not collected (see Table 12). Please provide an explanation.

- Reference 9 on page 94 has incorrectly listed Volume 65 for the article by Davies et al. 1995; the correct reference is Volume 61.

Again, we appreciate the efforts of Regional Board staff in developing this TMDL. Thank you for considering our comments.

If you have questions regarding our comments, please contact Matt Yeager or Naresh Varma at (909) 387-8109.

Sincerely,

for **PATRICK J. MEAD**, P.E.
Flood Control Engineer

PJM:NPV:MY:nh/MiddleSARTMDL Letter 031505

Attachment

cc: Hope Smythe, CRWQCB-SAR
Jason Uhley, Riverside County Flood Control and Water Conservation District
NPDES Coordinators
Matt Yeager
MK/VRO Reading File

National Beaches Conference
October 13-15, 2004
San Diego, CA

Selected Abstracts

http://www.tetratech-ffx.com/beaches/psession05.cfm

Sediments as a Reservoir of Indicator Bacteria in a Coastal Embayment - Mission Bay, California

Steve Gruber
MEC-Weston Solutions, Inc.
2433 Impala Drive
Carlsbad, CA 92008
Phone: 760-931-8081; e-mail: steve.gruber@westonsolutions.com

BIOSKETCH
Steve Gruber received his B.S. in Aquatic Biology from the College of Charleston, South Carolina and his M.S. in Biology from California State University, Fullerton. After graduate school, he worked for the U.S. Geological Survey National Water Quality Assessment Program as a research biologist assessing contaminant impacts on agricultural watersheds in eastern Washington State. He then worked as a research biologist for the Colorado Department of Public Health and Environment establishing state water quality criteria for biota and nutrients in lotic environments and writing TMDLs. For the past two years, Mr. Gruber has been a Senior Scientist with MEC-Weston Solutions, Inc. in Carlsbad, CA, working on watershed research projects such as source investigations, assessments of coastal embayments, and TMDL issues.

ABSTRACT
Mission Bay is a large, heavily used coastal embayment within the City of San Diego that includes over 27 miles of recreational shoreline. Historically, exceedences of state water quality standards for indicator bacteria (total coliform, fecal coliform, and enterococcus) have been a persistent problem at some beaches in Mission Bay. A two-year, comprehensive study was conducted to investigate and identify the numerous potential sources of bacterial contamination in the Bay receiving waters and surrounding watershed. As part of the investigation, intertidal sediments were assessed at some sites to determine the extent to which the beach sands act as a reservoir for indicator bacteria. The results suggested that bacterial densities in upper intertidal beach sands were significantly greater than those in lower intertidal beach sands. In addition, when the sediments in the upper intertidal zone were resuspended during simulated swimming activity, bacterial densities in the water column were an order of magnitude greater than those in samples collected when sediments were not disturbed. This pattern was not observed when the experiment was conducted in the lower intertidal zone. This phenomenon suggests that swimming activity may lead to greater bacterial densities in the water column and helps explain the pattern of bacterial contamination observed at some sites in Mission Bay. The study also has potentially important implications for other recreational beaches in southern California.

Enumeration and Characterization of Enterococci Found in Marine and Intertidal Sediments and Coastal Water in Southern California

Donna Ferguson
Orange County Public Health Laboratory
700 Shellmaker Road
Newport Beach, CA 92660
Phone: 949-219-0424; e-mail: dferguson@ochca.com

BIOSKETCH

Donna Ferguson is a Supervising Microbiologist for the Water Quality Department of the Orange County Public Health Laboratory. Ms. Ferguson received her B. S. in microbiology from California State University Long Beach and M.S. in Epidemiology from the UCLA School of Public Health. She has worked as a public health microbiologist for 10 years, specializing in parasitology. She also worked as research microbiologist for Metropolitan Water District of Southern California's water quality laboratory for 7 years working on Cryptosporidium, Giardia and Microsporidium detection and culture methods and watershed investigation studies. She is currently involved with fecal indicator source tracking studies.

ABSTRACT

Storm drains, rivers and estuaries are major sources of bacterial and nutrient pollutants to beaches located near these coastal outlet areas. Regulatory failures due to high levels of enterococci have been a common occurrence during summer dry weather periods at two beaches that differ in beach morphology and types of coastal outlets. Baby Beach, in Dana Point Harbor, is a small, enclosed beach with limited circulation. In contrast, Huntington Beach is a large, open beach bordering a marsh and river. High levels of enterococci were found in intertidal sediments adjacent to storm drains at Baby Beach. At Huntington Beach, the highest levels of enterococci were found in intertidal sediments from the river as compared to the surfzone sand and marine sediments at 10 m depths off shore near a sewage outfall and power plant. High levels of enterococci in sediment (1,000 - 10,000 CFU/10g) suggest the occurrence of bacterial regrowth.

To better understand the ecology of enterococci in the environment, isolates were characterized to species and strain level. E. faecalis, E. faecium and Streptococcus bovis were the predominant species isolated from water and sediments using mEI media (EPA Method 1600). E. faecalis isolates were subjected to pulsed-field gel electrophoresis (PFGE) molecular typing. Clonal populations were found in water, sediments and gull stools. We hypothesize that coastal outlets discharge enterococci and nutrients that are associated with sediments. Nutrients allow persistence and regrowth of bacteria in sediments. Thus, sediments may be an important source of these organisms to overlying water when resuspended or transported by tidal currents.

Amplification of Indicator Bacteria in Organic Debris on Southern California Beaches

Andrew Martin
MEC-Weston Solutions, Inc.
2433 Impala Drive
Carlsbad, CA 92008
Phone: 760-931-8081; e-mail: Andrew.martin@westonsolutions.com

BIOSKETCH

Mr. Andrew Martin is a Senior Scientist with MEC Analytical Systems - Weston Solutions (MEC-Weston) in Carlsbad, California. He received his B.S. in Geological Oceanography from the University of Washington. Mr. Martin's 9 years of experience as an environmental consultant spans a range of disciplines, providing expertise for emergency response to ecological incidents (oil spills, chemical spills and ship groundings), coastal oceanographic surveys, geophysical surveys, scientific dive surveys, storm water sampling, bacterial source identification studies and watershed management plans. He is skilled in designing and conducting sampling and analysis programs, modeling for NPDES permits requirements, performing Natural Resource Damage Assessments (NRDA) and using CAD/GIS.

ABSTRACT

Certain recreational beaches in southern California frequently exceed state water quality standards for indicator bacteria (total coliform, fecal coliform, and enterococcus). In San Diego County, two sites have been particularly problematic: Mission Bay, a large coastal embayment; and Dog Beach at the mouth of the San Diego River. Recent studies designed to investigate sources of indicator bacteria at these sites suggested that densities of indicator bacteria can be amplified through extended survival and reproduction in organic debris deposited on area beaches. This process was most prevalent in two common features of recreational beaches: organic debris deposited on the beach in the form of a wrack line and tidally influenced storm drains where organic debris frequently accumulates. Field investigations showed that the wrack line acts as a bacterial reservoir that can impact receiving waters. Indicator bacteria were concentrated in the organic debris deposited on the beach during spring tides, maintained in the wrack above the water line during neap tides, and then released back to the receiving waters during subsequent spring tides. At some locations, this process was considered to be a significant cause of bacterial water quality standard exceedances. In laboratory experiments that simulated tidally influenced storm drains, bacterial amplification was even more dramatic. Fecal coliform and enterococcus bacteria were shown to reproduce rapidly under conditions typical of coastal storm drains, with densities increasing three to four logs in 48 hours. The results have potential implications for managing recreational beach water quality in southern California.

Survival and Regrowth of Fecal Enterococci in Moist and Desiccated Sediments

Karen Rodgers
University of Georgia
3111 Plant Sciences
Athens, GA 30602-7272
Phone: 706-542-0898; e-mail: krod678940@aol.com

BIOSKETCH

Ms. Karen Rodgers holds a B.A. in communications (1991) from the State University of New York in Cortland and a Master's degree in communications (1994) from the University of Georgia. She received her B.S. in environmental health science (2003) from the University of Georgia. Currently, she is Research Coordinator II in the Soil Microbiology Laboratory in the Department of Crop & Soil Sciences at the University of Georgia, where she has been conducting bacterial source tracking research with Dr. Peter Hartel.

ABSTRACT

Moist and desiccated beach sediments may serve as reservoirs of fecal indicator bacteria. Desiccated saltwater beach sediments occur after extreme high tides; desiccated freshwater beach sediments occur when water levels drop. Bacterial regrowth may occur when sediments are rewetted and survivors dine on the deceased. We determined the ability of fecal enterococci to survive and regrow in moist and desiccated sediments. Fecal enterococci were enumerated in nonsterile sediments from Alabama, Georgia, New Hampshire, and Puerto Rico with the IDEXX Enterolert system. Counts were corrected because the sediments falsely inflated them. Numbers of fecal enterococci in the sediment were variable (0.95 to 4.78 log10 colony-forming units g-1 dry weight). Survival in moist sediment was determined with sentinel chambers containing known Enterococcus species. None of the three Enterococcus species, Ent. faecalis, Ent. faecium, and Ent. gallinarum, or seven Ent. faecalis subspecies survived >14 days in moist sediment. Some sediments were air-dried at room temperature and rewetted after 2, 30, and 60 days, then sampled immediately (survival) and after one day (regrowth). Fecal enterococci survived 2, 30, and 60 days of desiccation in all sediments and regrew in most. Survival ranged from 16 to >100%; regrowth ranged from 0 to >3000%. Because sediments are reservoirs of fecal enterococci, beach monitoring needs to include sediment sampling. Also, regulators need to reconsider the rule that assumes fecal indicator bacteria do not survive and regrow in the environment. Finally, these results affect bacterial source tracking because desiccated bacteria may represent a source of past fecal contamination.

Indicator Bacterial Populations in the Las Vegas valley - Part I: Source Identification

Angela Rosenblatt
City of Henderson
Water Quality Laboratory
200 Athens Avenue
P.O. Box 95050
Henderson, NV 89009-5050
Phone: 707-267-2750; e-mail: angela.rosenblatt@cityofhenderson.com

BIOSKETCH

Ms. Angela Rosenblatt has been working in the field of water quality for over ten years. She is currently employed as a Chemist for the City of Henderson. She is completing her Master's Degree in Environmental Microbiology and is presenting research from her thesis project. She is a member of several professional organizations including American Society for Microbiology, Water Environment Federation and American Water Works Association and has made many presentations including those for the ASM, Nevada Water Environment Association and the WateReuse Association.

ABSTRACT

The Las Vegas Wash (LVW), a tributary to Lake Mead, is the only drainage point for the entire hydrographic basin. Contributing sources include groundwater, stormwater, urban runoff and 160 million gallons per day of tertiary-treated wastewater. High levels of fecal contamination are observed in the LVW. This is of concern as Lake Mead is the major source of drinking water for Las Vegas. We have conducted several studies to determine the sources of this microbial signal.

Comprehensive phenotypic speciation (500 isolates) of enterococcal populations from three LVW associated matrices was conducted at two time points. API strips were used to determine that human signals (Enterococcus faecium and Enterococcus faecalis) accounted for 18% of the isolates, while the environmental signal (Enterococcus avium and Enterococcus gallinarum) was 81%.

These results correlate with studies on growth and survivability of enterococcal and streptococcal species in natural LVW water, which were estimated by inoculating sterile LVW water with ATCC enterococcal and streptococcal species and conducting heterotrophic plate counts at specified intervals. The species most commonly found in the LVW survived for > 63 days.

Studies sought to determine if significant levels of indicator bacteria isolated from tertiary-treated wastewater were able to regrow or resuscitate in the LVW. Wastewater disinfected by chlorination, chloramination and UV was assessed. No significant fecal coliform recovery from the chlorinated or chloraminated effluent was observed, however the UV treated effluent demonstrated a 10-20 fold increase. These studies provide important information for wastewater treatment and for proper watershed management.

4/29

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WBZ 4/29

DEPARTMENT OF ENVIRONMENTAL SCIENCES – 084
2207 GEOLOGY BUILDING
RIVERSIDE, CALIFORNIA 92521-0424

HTTP://www.envisci.ucr.edu
FAX: (951) 827-3993

JES - has cc

April 22, 2005

Hope Smythe, Chief
Inland Waters Planning Section
Santa Ana Regional Water Quality Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3348

Re: Review of Draft TMDL for Bacterial Indicators in Middle Santa Ana River Watershed Waterbodies

Dear Ms. Smythe,

Attached please find a review of the above-named document. If you have any questions regarding the review, please feel free to contact me at 951-827-2358.

Sincerely,

Marylynn V. Yates
Professor of Environmental Microbiology

"Draft TMDL for Bacterial Indicators in Middle Santa Ana River Watershed Waterbodies"

Review by:

Marylynn V. Yates
Department of Environmental Sciences
University of California. Riverside. CA

Comments on Text Formatting

Responses to specific Scientific Issues requested.

1. The nature of the water quality problem

In general. the report does a very good job of explaining the rationale for choosing the sampling locations. the sampling programs conducted. and the results obtained. However. several references were made to fact that the results at a certain site exceeded "the minimum number of exceedances for listing a waterbody on the 303(d) list". What is that minimum? Is it one? Is it a percentage of the total number of samples? This should be explained in the document (it may be there. but I was not able to find it easily).

In Table 7. it would be helpful if the reason for sampling at a given site contained more information than "impairment status".

Interpretation of the sampling results in Table 10 and 11 would be facilitated by indicating to which waterbodies each of the samples corresponds. For example. which samples correspond to Chino Creek, Reach 1? It is stated earlier in the document, but it would be helpful to place that information in the table, so that it is clear that there was an exceedance of the 303(d) criteria for either the log mean or individual sample for each of the waterbodies.

Figures 23-27 are redundant with information in Table 10.

2. Numeric target derivation

As the fecal coliform water quality objective for REC1 waterbodies is the most restrictive. it is prudent to choose that as the numerical target for the TMDL.

3. Identification of fecal coliform source categories

Based on the monitoring programs conducted, it is clear that agriculture and urban runoff are sources of fecal coliform bacteria to the watershed during both dry and rainy seasons. However, the basis for statement that, "Open space and wilderness areas are not significant sources of fecal coliform under the dry weather conditions investigated." is not clear. Was a statistical analysis performed to enable this determination?

The statement that "POTW discharges to the Santa Ana River and tributaries are not sources of fecal coliform" is not correct. As shown in Table 13, there were total coliform bacteria present in concentrations higher than permitted in discharges from POTWs. It is likely that some of these were fecal coliform bacteria.

In addition to doing studies on the potential for survival and regrowth of fecal coliform bacteria, it is essential to perform studies of that type using the indicators (e.g., *E. coli* and enterococci) that are currently under consideration for use by DHS. This will be useful in amending the TMDL when the new indicator criteria are established.

4. Linkage analysis

The assumption that fecal coliform concentrations at or below the existing Basin Plan fecal coliform water quality objectives will ensure that the numerical target is met seems reasonable. If, however, significant regrowth is occurring, and/or the organisms are surviving for extended periods of time, this assumption may not be correct.

5. TMDL/Wasteload Allocations (WLAs)/Load Allocations (LAs)

It is assumed that there is an error in Table 14, and the entries in all columns should read, "...and not more than 10% of the samples exceed 400 organisms/100 ml for any 30-day period." Given that assumption, then the proposed TMDL/WLAs/LAs seem appropriate. If, however, significant regrowth is occurring, and/or the organisms are surviving for extended periods of time, then the Basin Plan fecal coliform water quality objective for REC1 waterbodies may not be able to be met.

6. Margin of Safety/Critical Conditions

One of the bases for the statement that a "substantial and adequate" margin of safety is implicitly incorporated is that the TMDL and load allocations do not account for dilution and die-off. If, however, significant regrowth is occurring, and/or the organisms are surviving for extended periods of time, they could overcome the effects of die-off and lack of dilution. It would seem imperative to conduct survival and regrowth studies to determine the magnitude of these effects on the ability to achieve the numerical targets.

The requirement that there be compliance with the WLAs and LAs on a year-round basis are appropriate. However, based on the monitoring results during storm events, there need to be provisions for the WLAs and LAs during storm events.

7. Implementation/Monitoring

In general, the implementation plan proposed in the document seems to be appropriate.

The monitoring proposed in the Basin Plan Amendment (Attachment A) only requires monitoring to determine whether the actions and programs implemented pursuant to the TMDLS are effective. However, it is not clear that this minimal level of monitoring will enable the Regional Board to revise the TMDL to more accurately reflect the sources of pathogens in the watershed. As stated on p. 84 of 143, much more intensive monitoring of the agricultural, urban, and open space runoff needs to be performed to identify specific sources of pathogens in the watershed. A more specific directive to perform this monitoring needs to be included in the TMDL.

In anticipation of the adoption of new indicators to conform with the USEPA's national water quality criteria recommendations, the data that have already been collected on the occurrence of enterococci and *E. coli* in the watershed need to be analyzed. As new monitoring programs are implemented, the additional data on these indicators need to be evaluated as well.

In the Watershed-Wide Bacterial Indicator Water Quality Monitoring Program (pp.122-123 of 143), please note that there is no organism called Escherichia Coliform (e.coli). This needs to be changed to either *Escherichia coli* or *E. coli*. In addition, the methods to be used to analyze for the constituents need to be specified.

8. "Overarching" questions

In general, except as noted above and below, the scientific basis for the proposed rule is sound. It would be desirable to have more data on which to base the TMDL, but it is recognized that the best use is being made of the existing data. It is strongly recommended that specific requirements for more detailed monitoring be included in the Basin Plan Amendment.

General Comments:

- On p. 45 of 143, the following statement is made, "However, densities of bacterial indicators above certain levels indicate that there may be other organisms present that are harmful to public health." There is abundant evidence that pathogenic microorganisms can be present in waters in the absence of bacterial indicators, and that disease outbreaks have occurred in these situations. I believe that this discussion needs to be expanded to include a statement to reflect this fact.

- On p. 47 of 143, the following statement is made, "... microorganisms in densities above certain levels in water can cause adverse health effects ..." This statement is very unclear. At what pathogen density will the water not cause adverse effects? To meet EPA's health goal of less than 1 infection per 10,000 people per year, the acceptable density of rotavirus is 2.2 pfu/10 million liters.

- Most, if not all, of the figures showing fecal coliform monitoring results should use a logarithmic scale for the y-axis. This will facilitate reading the graphs.

- Throughout the document, *Escherichia coli* should be referred to as *E. coli*, rather than *e. coli*.

- Tables A4 through A12 need to have the appropriate column headings changed to "Total coliform bacteria" and "Fecal coliform bacteria"

Attachment E

E. Coli and Enterococcus Monitoring Data

from February 2002 through March 2004

Table 1: Analytical Results (CFU/100ml) for E. Coli at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Feb – Apr 2002

Site No.	Land Use	Location	2–5–02	2–7–02	2–13–02	2–20–02	2–27–02	3–12–02	3–14–02	3–20–02	3–27–02	4–3–02
C1	Open Sp	Icehouse Cyn Ck	9	10	10	10	10	10	10	10	10	10
C2	Urban	Chino Ck @ Schaeffer Ave.	**5,600**	**500**	**5,800**	**8,100**	**890**	**2,100**	**440**	**2,500**	10	**510**
C3	TMDL Eval	Prado Pk Lake	**260**	**260**	200	**220**	210	140	**270**	70	60	120
C4	TMDL Eval	Chino Ck Above Wetlands	**240**	**280**	140	170	200	**240**	10	80	120	140
C5	TMDL Eval	OC Wetlands Effluent	20	130	90	150	180	110	200	140	140	**220**
C6	TMDL Eval	Ch. Ck Below Wetlands	NA	NA	NA	NA	**910**	NA	**410**	150	40	**220**
C7	TMDL Eval	Chino Ck @ Central	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C8	TMDL Eval	Chino Ck @ Prado GC	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	10	10	10	10	10	10	10	10	10	10
M2	Urban	Cucam Ck @ RP–1	**5,300**	**5,600**	**2,500**	**3,500**	**3,200**	**880**	**2,000**	**4,800**	**1,000**	**4,300**
M3	Ag	Bon View & Merrill	**4,700**	**1,700**	200	**91,000**	**12,000**	**1,000**	**600**	**99,000**	**70,000**	Dry
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	120	**680**	180	60	70	90	50	100	60	80
S1	TMDL Eval	SAR @ MWD Xing	70	60	80	50	100	**310**	160	60	120	140
S2	TMDL Eval	SAR Below Prado Dam	10	10	50	150	**360**	**340**	**290**	**350**	40	120
S3	TMDL Eval	SAR @ Hamner	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS

Gray Highlight Indicates Sample Result Greater Than 211 CFU/100ml
NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 2: Analytical Results (CFU/100ml) for E. Coli at TMDL Monitoring Locations in Middle Santa Ana River Watershed, July & Sept 2002

Site No.	Land Use	Location	7–10–02	7–17–02	7–24–02	7–31–02	8–7–02	9–11–02	9–18–02	9–25–02	10–2–02	10–9–02
C1	Open Sp	Icehouse Cyn Ck	110	50	50	10	60	170	160	NA	90	20
C2	Urban	Chino Ck @ Schaeffer Ave.	**2,300**	**1,100**	**1,400**	80	30	90	**940**	10	**800**	**1,600**
C3	TMDL Eval	Prado Pk Lake	140	30	50	60	120	Dry	Dry	Dry	100	80
C4	TMDL Eval	Chino Ck Above Wetlands	140	100	100	9	50	**480**	**530**	**240**	**290**	80
C5	TMDL Eval	OC Wetlands Effluent	**460**	**770**	**430**	**390**	**740**	**560**	**1,800**	**420**	**450**	**270**
C6	TMDL Eval	Ch. Ck Below Wetlands	**430**	**310**	**410**	**530**	**350**	**340**	**420**	210	**310**	**370**
C7	TMDL Eval	Chino Ck @ Central	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C8	TMDL Eval	Chino Ck @ Prado GC	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	50	30	40	10	50	9	10	10	50	10
M2	Urban	Cucam Ck @ RP–1	**570**	**5,200**	**23,000**	**3,700**	**8,700**	**600**	**800**	**1,970**	**4,000**	**2,700**
M3	Ag	Bon View & Merrill	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	**910**	**410**	**250**	**330**	**500**	**470**	**400**	**640**	**410**	210
S1	TMDL Eval	SAR @ MWD Xing	180	160	120	20	160	180	80	210	200	150
S2	TMDL Eval	SAR Below Prado Dam	**260**	**270**	**270**	**340**	**370**	**270**	**360**	**360**	**260**	**250**
S3	TMDL Eval	SAR @ Hamner	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS

Gray Highlight Indicates Sample Result Greater Than 211 CFU/100ml
NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 3: Analytical Results (CFU/100ml) for E. Coli at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Jan & Mar 2003

Site No.	Land Use	Location	1–8–03	1–15–03	1–22–03	1–29–03	2–5–03	3–12–03	3–19–03	3–26–03	4–2–03	4–9–03
C1	Open Sp	Icehouse Cyn Ck	9	9	10	10	10	10	10	10	10	10
C2	Urban	Chino Ck @ Schaeffer Ave.	150	110	**920**	**1,400**	**230**	100	**550**	50	**280**	**1,080**
C3	TMDL Eval	Prado Pk Lake	70	**240**	**610**	**320**	90	**340**	**4,400**	90	**240**	140
C4	TMDL Eval	Chino Ck Above Wetlands	**240**	120	200	**220**	**260**	100	**5,200**	**4,200**	170	**340**
C5	TMDL Eval	OC Wetlands Effluent	130	**380**	**280**	**360**	**370**	**490**	**360**	70	50	**300**
C6	TMDL Eval	Ch. Ck Below Wetlands	NA	NA	NA	150	**400**	NA	NA	NA	NA	NA
C7	TMDL Eval	Chino Ck @ Central	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C8	TMDL Eval	Chino Ck @ Prado GC	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	9	9	10	30	10	10	10	10	20	10
M2	Urban	Cucam Ck @ RP–1	**11,000**	**2,700**	**3,300**	**700**	**1,000**	10	**260**	10	50	**320**
M3	Ag	Bon View & Merrill	Dry	Dry	Dry	Dry	Dry	Dry	**4,400,000**	**150,000**	Dry	Dry
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	**530**	190	**280**	**330**	**260**	90	**510**	10	70	210
S1	TMDL Eval	SAR @ MWD Xing	120	50	60	70	**250**	140	**500**	90	20	40
S2	TMDL Eval	SAR Below Prado Dam	9	9	10	120	**310**	10	**530**	10	**460**	100
S3	TMDL Eval	SAR @ Hamner	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS

Gray Highlight Indicates Sample Result Greater Than 211 CFU/100ml
NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 4: Analytical Results (CFU/100ml) for E. Coli at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Jan – Mar 2004

Site No.	Land Use	Location	1-7-04	1-14-04	1-21-04	1-28-04	2-4-04	2–11–04	2–18–04	2–25–04	3–3–04	3–10–04
C1	Open Sp	Icehouse Cyn Ck	99	9	NA	9	9	9	9	40	9	9
C2	Urban	Chino Ck @ Schaeffer Ave.	**550**	**460**	200	9	20	**330**	30	30	**250**	**270**
C3	TMDL Eval	Prado Pk Lake	140	**320**	60	200	40	80	80	30	180	100
C4	TMDL Eval	Chino Ck Above Wetlands	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C5	TMDL Eval	OC Wetlands Effluent	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C6	TMDL Eval	Ch. Ck Below Wetlands	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C7	TMDL Eval	Chino Ck @ Central	180	80	99	40	70	40	**280**	50	**250**	40
C8	TMDL Eval	Chino Ck @ Prado GC	30	**560**	**350**	70	**860**	**420**	**510**	**480**	**9,900**	60
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	9	20	9	9	9	9	9	NA	30	9
M2	Urban	Cucam Ck @ RP–1	**1,010**	**2,700**	**3,100**	200	**1,840**	**510**	**730**	**300**	**410**	9
M3	Ag	Bon View & Merrill	Dry	Dry	Dry	Dry	Dry	Dry	Dry	**79,000**	**36,000**	Dry
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	140	**240**	**2,600**	40	210	40	90	140	**440**	40
S1	TMDL Eval	SAR @ MWD Xing	120	**240**	140	80	**550**	120	99	190	**9,700**	50
S2	TMDL Eval	SAR Below Prado Dam	9	9	9	9	**1,800**	30	9	**340**	190	40
S3	TMDL Eval	SAR @ Hamner	99	110	160	130	**1,080**	200	70	**260**	**7,700**	40

Gray Highlight Indicates Sample Result Greater Than 211 CFU/100ml
NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 5: Analytical Results (CFU/100ml) for E. Coli at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Mar/Apr 2004; and Summary of TMDL Monitoring

Site No.	Land Use	Location	3–17–04	3–24–04	3–31–04	4–7–04	4–14–04	TOTAL NUMBER OF SAMPLES: FEB 2002 – APR 2004	Number of Samples w/Densities Greater Than 211 CFU/100ml	Percentage of Samples w/Densities Greater Than 211 CFU/100ml
C1	Open Sp	Icehouse Cyn Ck	30	9	9	9	9	43	0	0
C2	Urban	Chino Ck @ Schaeffer Ave.	9	**480**	20	**310**	150	45	28	62
C3	TMDL Eval	Prado Pk Lake	9	20	30	30	40	42	11	26
C4	TMDL Eval	Chino Ck Above Wetlands	NAS	NAS	NAS	NAS	NAS	30	13	43
C5	TMDL Eval	OC Wetlands Effluent	NAS	NAS	NAS	NAS	NAS	30	18	60
C6	TMDL Eval	Ch. Ck Below Wetlands	NAS	NAS	NAS	NAS	NAS	17	13	76
C7	TMDL Eval	Chino Ck @ Central	80	40	70	99	150	15	2	13
C8	TMDL Eval	Chino Ck @ Prado GC	40	**240**	140	130	**280**	15	9	60
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	9	NA	9	9	9	43	0	0
M2	Urban	Cucam Ck @ RP–1	**300**	**250**	**270**	9	180	45	38	84
M3	Ag	Bon View & Merrill	Dry	Dry	Dry	Dry	Dry	13	12	92
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	0	0	NA
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	9	60	140	60	110	45	18	40
S1	TMDL Eval	SAR @ MWD Xing	140	NA	140	140	80	44	6	14
S2	TMDL Eval	SAR Below Prado Dam	9	20	**410**	40	9	45	20	44
S3	TMDL Eval	SAR @ Hamner	99	99	40	160	80	15	3	20

Gray Highlight Indicates Sample Result Greater Than 211 CFU/100ml
NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Gray Highlight Indicates That More Than 10% of Samples At a Specified Location Exceeded 211 CFU/100ml

Table 6 – Logarithmic Means (CFU/100ml) and Summaries for E. Coli at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Feb 2002 – Mar 2004

Site No.	Land Use	Location	Feb 2002	Mar 2002	Jul 2002	Sept 2002	Jan 2003	Mar 2003	Jan 2004	Feb 2004	Mar 2004	Number of Log Means	Number of Log Means Greater Than 113 CFU/100ml	Percentage of Log Means Greater Than 113 CFU/100ml
C1	Open Sp	Icehouse Cyn Ck	10	10	44	84	10	10	16	12	11	9	0	0
C2	Urban	Chino Ck @ Schaeffer Ave.	2592	411	385	255	345	242	98	115	83	9	7	78
C3	TMDL Eval	Prado Pk Lake	229	114	69	DRY	197	340	117	81	23	8	5	63
C4	TMDL Eval	Chino Ck Above Wetlands	200	80	58	269	201	661	NAS	NAS	NAS	6	4	67
C5	TMDL Eval	OC Wetlands Effluent	91	157	535	552	284	179	NAS	NAS	NAS	6	5	83
C6	TMDL Eval	Ch. Ck Below Wetlands	NA	153	399	322	NA	NA	NAS	NAS	NAS	3	3	100
C7	TMDL Eval	Chino Ck @ Central	NAS	NAS	NAS	NAS	NAS	NAS	83	89	80	3	0	0
C8	TMDL Eval	Chino Ck @ Prado GC	NAS	NAS	NAS	NAS	NAS	NAS	204	572	137	3	3	100
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	10	10	31	14	12	11	11	12	9	9	0	0
M2	Urban	Cucam Ck @ RP–1	3836	2051	4659	1592	2330	53	1255	210	127	9	8	89
M3	Ag	Bon View & Merrill	4450	8030	DRY	DRY	DRY	DRY	DRY	DRY	DRY	2	2	100
M4	Ag	Archibald & Cloverdale	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	0	0	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	144	74	434	401	300	92	236	98	55	9	5	56
S1	TMDL Eval	SAR @ MWD Xing	70	138	102	155	91	87	178	256	122	9	5	56
S2	TMDL Eval	SAR Below Prado Dam	49	175	299	296	31	75	26	59	31	9	3	33
S3	TMDL Eval	SAR @ Hamner	NAS	NAS	NAS	NAS	NAS	NAS	190	257	87	3	2	67

Gray Highlight Indicates Sample Result Greater Than 113 CFU/100ml
NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 7: Analytical Results (CFU/100ml) for Enterococcus at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Feb – Apr 2002

Site No.	Land Use	Location	2–5–02	2–7–02	2–13–02	2–20–02	2–27–02	3–12–02	3–14–02	3–20–02	3–27–02	4–3–02
C1	Open Sp	Icehouse Cyn Ck	9	10	10	10	20	20	10	10	100	100
C2	Urban	Chino Ck @ Schaeffer Ave.	2,800	1,400	3,600	2,500	400	8,500	2,100	65,000	650	2,100
C3	TMDL Eval	Prado Pk Lake	200	150	170	300	150	110	410	60	100	100
C4	TMDL Eval	Chino Ck Above Wetlands	160	180	110	120	370	110	230	100	120	230
C5	TMDL Eval	OC Wetlands Effluent	50	100	130	90	220	90	70	60	60	140
C6	TMDL Eval	Ch. Ck Below Wetlands	NA	NA	NA	NA	720	NA	340	370	80	500
C7	TMDL Eval	Chino Ck @ Central	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C8	TMDL Eval	Chino Ck @ Prado GC	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	10	10	20	20	30	10	10	10	100	10
M2	Urban	Cucam Ck @ RP–1	2,100	500	5,200	7,000	1,700	940	410	7,200	3,200	2,600
M3	Ag	Bon View & Merrill	320,000	150,000	60,000	3,000,000	32,000	60,000	75,000	730,000	700,000	Dry
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	600	2,000	4,000	850	200	910	800	990	850	4,500
S1	TMDL Eval	SAR @ MWD Xing	290	240	340	380	420	2,900	840	860	460	530
S2	TMDL Eval	SAR Below Prado Dam	20	20	230	50	240	310	200	1,000	80	140
S3	TMDL Eval	SAR @ Hamner	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS

NAS = Sampling site was not part of the monitoring program *during the specified monitoring period.*
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 8: Analytical Results (CFU/100ml) for Enterococcus at TMDL Monitoring Locations in Middle Santa Ana River Watershed, July & Sept 2002

Site No.	Land Use	Location	7–10–02	7–17–02	7–24–02	7–31–02	8–7–02	9–11–02	9–18–02	9–25–02	10–2–02	10–9–02
C1	Open Sp	Icehouse Cyn Ck	140	160	160	60	60	70	110	NA	100	30
C2	Urban	Chino Ck @ Schaeffer Ave.	1,800	2,600	2,700	230	60	1,300	3,200	680	1,700	2,500
C3	TMDL Eval	Prado Pk Lake	200	100	280	50	50	Dry	Dry	Dry	870	120
C4	TMDL Eval	Chino Ck Above Wetlands	270	270	250	50	50	360	380	400	880	120
C5	TMDL Eval	OC Wetlands Effluent	320	380	400	360	500	700	1,420	500	430	190
C6	TMDL Eval	Ch. Ck Below Wetlands	11,000	28,000	41,000	10,000	37,000	91,000	22,000	430	37,000	37,000
C7	TMDL Eval	Chino Ck @ Central	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C8	TMDL Eval	Chino Ck @ Prado GC	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	200	480	150	40	70	60	110	40	60	20
M2	Urban	Cucam Ck @ RP–1	3,100	21,000	54,000	4,200	11,700	5,300	6,400	5,600	6,800	5,800
M3	Ag	Bon View & Merrill	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	110,000	150,000	170,000	62,000	310,000	260,000	390,000	198,000	110,000	110,000
S1	TMDL Eval	SAR @ MWD Xing	1,800	2,500	2,300	340	1,000	2,200	1,400	1,400	1,200	1,100
S2	TMDL Eval	SAR Below Prado Dam	5,900	11,000	8,900	38,000	38,000	29,400	29,000	20,000	13,000	3,700
S3	TMDL Eval	SAR @ Hamner	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS

NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 9: Analytical Results (CFU/100ml) for Enterococcus at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Jan & Mar 2003

Site No.	Land Use	Location	1–8–03	1–15–03	1–22–03	1–29–03	2–5–03	3–12–03	3–19–03	3–26–03	4–2–03	4–9–03
C1	Open Sp	Icehouse Cyn Ck	9	9	10	10	10	80	10	10	10	10
C2	Urban	Chino Ck @ Schaeffer Ave.	2,000	610	1,200	1,300	920	660	50,000	550	620	1,060
C3	TMDL Eval	Prado Pk Lake	80	9	210	110	30	30	4,600	70	90	80
C4	TMDL Eval	Chino Ck Above Wetlands	200	140	130	240	210	30	6,400	440	70	130
C5	TMDL Eval	OC Wetlands Effluent	360	750	380	310	230	680	1,100	190	270	320
C6	TMDL Eval	Ch. Ck Below Wetlands	NA	NA	NA	10	900	NA	NA	NA	NA	NA
C7	TMDL Eval	Chino Ck @ Central	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C8	TMDL Eval	Chino Ck @ Prado GC	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	9	9	10	10	10	10	20	20	110	10
M2	Urban	Cucam Ck @ RP–1	15,000	2,000	5,200	2,500	1,700	780	180	410	1,400	1,030
M3	Ag	Bon View & Merrill	Dry	Dry	Dry	Dry	Dry	Dry	5,900,000	150,000	Dry	Dry
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	9,600	7,000	7,000	15,000	7,600	3,000	2,000	970	1,300	920
S1	TMDL Eval	SAR @ MWD Xing	750	460	550	600	1,200	960	1,500	490	390	380
S2	TMDL Eval	SAR Below Prado Dam	9	9	40	290	810	30	5,000	70	10	10
S3	TMDL Eval	SAR @ Hamner	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS

NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 10: Analytical Results (CFU/100ml) for Enterococcus at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Jan – Mar 2004

Site No.	Land Use	Location	1-7-04	1-14-04	1-21-04	1-28-04	2-4-04	2-11-04	2-18-04	2-25-04	3-3-04	3-10-04
C1	Open Sp	Icehouse Cyn Ck	90	20	NA	9	9	9	9	9	9	9
C2	Urban	Chino Ck @ Schaeffer Ave.	420	1,200	4,600	510	260	870	810	260	410	1,520
C3	TMDL Eval	Prado Pk Lake	60	250	40	80	70	140	40	9	350	80
C4	TMDL Eval	Chino Ck Above Wetlands	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C5	TMDL Eval	OC Wetlands Effluent	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C6	TMDL Eval	Ch. Ck Below Wetlands	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS	NAS
C7	TMDL Eval	Chino Ck @ Central	670	490	130	250	310	120	340	1,300	340	110
C8	TMDL Eval	Chino Ck @ Prado GC	390	400	320	390	2,000	280	260	740	580	200
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	9	9	9	9	9	20	9	NS	9	9
M2	Urban	Cucam Ck @ RP–1	950	3,100	5,600	4,300	6,400	1,190	2,900	370	1,000	40
M3	Ag	Bon View & Merrill	Dry	Dry	Dry	Dry	Dry	Dry	Dry	166,000	330,000	Dry
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	5,200	50	2,600	460	690	260	420	460	680	99
S1	TMDL Eval	SAR @ MWD Xing	640	520	250	630	1,600	520	760	860	22,000	340
S2	TMDL Eval	SAR Below Prado Dam	20	30	20	20	8,600	90	20	1,240	1,140	9
S3	TMDL Eval	SAR @ Hamner	520	490	390	740	3000	830	820	1,400	13,400	410

NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 11: Analytical Results (CFU/100ml) for Enterococcus at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Mar/Apr 2004

Site No.	Land Use	Location	3–17–04	3–24–04	3–31–04	4–7–04	4–14–04		TOTAL NUMBER OF SAMPLES: FEB 2002 – APR 2004
C1	Open Sp	Icehouse Cyn Ck	9	9	9	9	9		43
C2	Urban	Chino Ck @ Schaeffer Ave.	230	740	9	1,540	560		45
C3	TMDL Eval	Prado Pk Lake	20	9	9	9	40		42
C4	TMDL Eval	Chino Ck Above Wetlands	NAS	NAS	NAS	NAS	NAS		30
C5	TMDL Eval	OC Wetlands Effluent	NAS	NAS	NAS	NAS	NAS		30
C6	TMDL Eval	Ch. Ck Below Wetlands	NAS	NAS	NAS	NAS	NAS		17
C7	TMDL Eval	Chino Ck @ Central	340	120	100	340	220		15
C8	TMDL Eval	Chino Ck @ Prado GC	180	330	200	410	240		15
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	9	NA	200	9	9		43
M2	Urban	Cucam Ck @ RP–1	1,230	1,500	260	840	710		45
M3	Ag	Bon View & Merrill	Dry	Dry	Dry	Dry	Dry		13
M4	Ag	Archibald & Cloverdale	Dry	Dry	Dry	Dry	Dry		0
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	80	50	110	280	230		45
S1	TMDL Eval	SAR @ MWD Xing	340.0	NA	100	370	140		44
S2	TMDL Eval	SAR Below Prado Dam	20	9	1,090	9	20		45
S3	TMDL Eval	SAR @ Hamner	350	280	130	320	190		15

NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.

Table 12 – Logarithmic Means (CFU/100ml) for Enterococcus at TMDL Monitoring Locations in Middle Santa Ana River Watershed, Feb 2002 – Mar 2004

Site No.	Land Use	Location	Feb 2002	Mar 2002	Jul 2002	Sept 2002	Jan 2003	Mar 2003	Jan 2004	Feb 2004	Mar 2004	Number of Log Means
C1	Open Sp	Icehouse Cyn Ck	11	29	105	69	10	15	20	9	9	9
C2	Urban	Chino Ck @ Schaeffer Ave.	1,698	4,365	705	1,644	1,119	1,642	790	648	266	9
C3	TMDL Eval	Prado Pk Lake	187	122	107	DRY	55	147	80	68	14	8
C4	TMDL Eval	Chino Ck Above Wetlands	170	148	135	357	179	238	NAS	NAS	NAS	6
C5	TMDL Eval	OC Wetlands Effluent	105	79	388	527	374	415	NAS	NAS	NAS	6
C6	TMDL Eval	Ch. Ck Below Wetlands	NA	266	21,573	16,378	NA	NA	NAS	NAS	NAS	3
C7	TMDL Eval	Chino Ck @ Central	NAS	NAS	NAS	NAS	NAS	NAS	319	288	198	3
C8	TMDL Eval	Chino Ck @ Prado GC	NAS	NAS	NAS	NAS	NAS	NAS	522	362	259	3
M1	Open Sp	Cucam. Ck. @ CCWD Ponds	16	16	132	50	10	21	9	11	20	9
M2	Urban	Cucam Ck @ RP–1	2,304	1,874	11,155	5,955	3,667	608	3,399	552	779	9
M3	Ag	Bon View & Merrill	194,237	218,982	DRY	DRY	DRY	DRY	DRY	DRY	DRY	2
M4	Ag	Archibald & Cloverdale	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	0
M5	TMDL Eval	Mill Ck @ Ch–Cor. Rd	960	1,225	140,067	189,277	8,828	1,474	735	320	123	9
S1	TMDL Eval	SAR @ MWD Xing	328	874	1,286	1,416	672	637	609	1,205	205	9
S2	TMDL Eval	SAR Below Prado Dam	64	234	15,284	15,233	60	64	73	118	32	9
S3	TMDL Eval	SAR @ Hamner	NAS	NAS	NAS	NAS	NAS	NAS	739	1,392	239	3

NAS = Sampling site was not part of the monitoring program during the specified monitoring period.
NA = Sampling site was not accessible during sampling event
Dry = No sample was collected at the location because there was insufficent flow.